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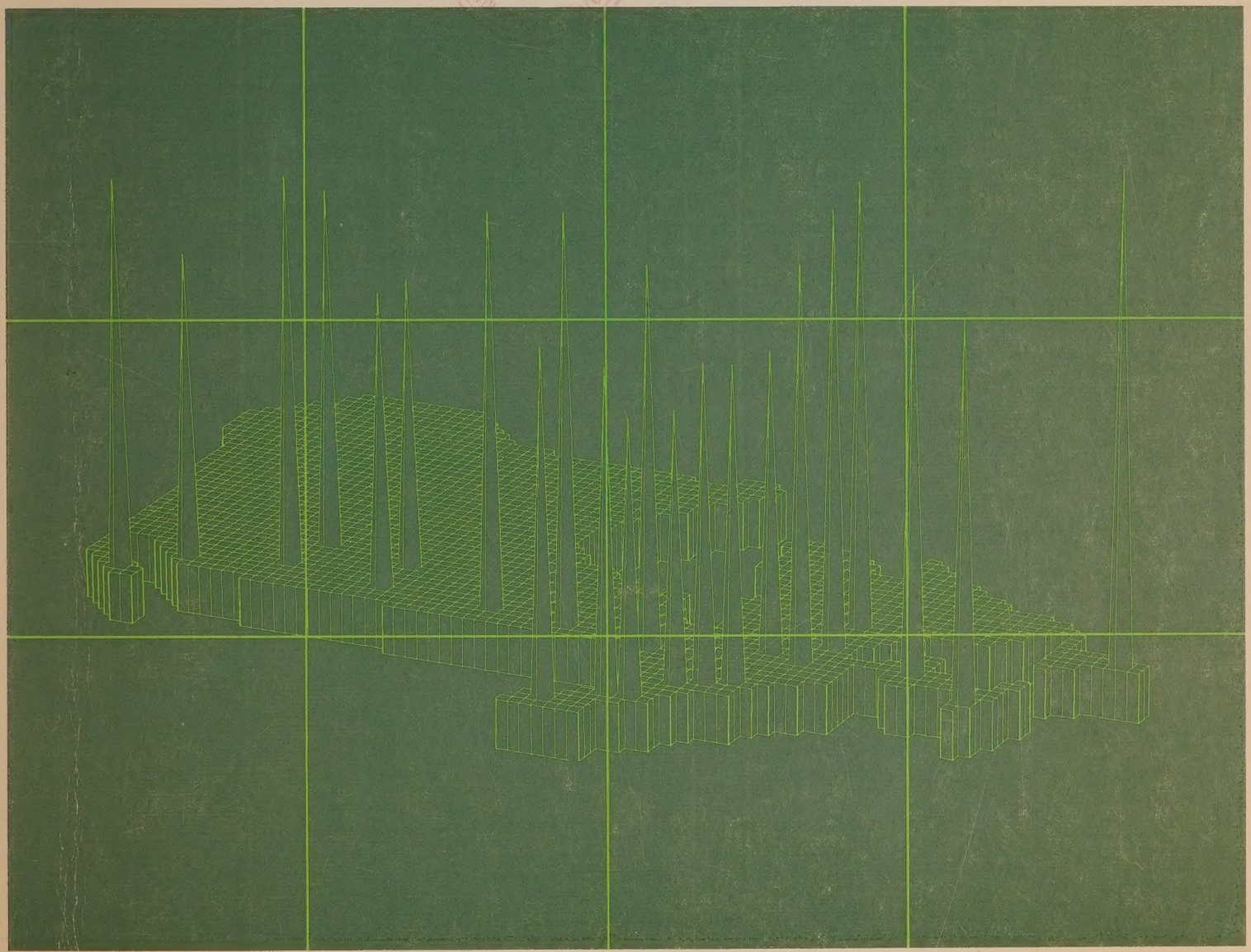
URBAN INDICATORS

Statistical Profiles of Quality of Life for Canadian Cities



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URBAN INDICATORS

Statistical Profiles of Quality of Life for Canadian Cities

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URBAN INDICATORS

Statistical Profiles of Quality of Life for Canadian Cities

REVISED EDITION
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Human Environment Directorate

Ministry of State
Urban Affairs Canada

Honourable André Ouellet,
Minister

Ministère d'État
Affaires urbaines Canada

L'honorable André Ouellet,
ministre

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Despite a growing interest in the quality of various aspects of their lives, Canadians have generally been deprived of such information. The inability of experts to decide how 'quality' should be measured and the vulnerability of quality-of-life indicators to charges of imperfections, have led to the abandonment of many attempts. Only recently have some brave ventures appeared in public.

The Ministry of State for Urban Affairs is well aware of the limitations of quality-of-life indicators and the usual arguments against their use. However, since these arguments may serve as warnings to the reader as to how the indicators should be assessed, they are briefly summarised below.

The first argument is that it is impossible to establish the importance of a particular indicator relative to others. Is a change in the automobile accident rate a more important indicator than a change in the air pollution rate? Frankly, we do not know, so we do not even try to add up the indicators to give an overall quality-of-life figure. Assess them individually and view what you will with alarm or satisfaction.

The second argument is that the initial reporting of many of the facts from which the statistics are formulated is suspect. Some jurisdictions may be meticulous in recording and reporting information, others may be careless or even deliberately under-report events which cast them in an unfavourable light. When this is the case for a particular indicator, the problem should be brought out into the open so that those who have an interest in the measures can pursue the question of accuracy.

The third argument is that an indicator itself can be ambiguous. The divorce rate, for instance, can be seen either as a positive indicator, freeing people from unhappy marriages, or as a negative indicator, showing the breakdown of the family. Take your pick.

A fourth argument is that the level of a condition in a given year is not as important as whether that level is an improvement or deterioration over previous years. A crime rate of 500 per 10,000 of population would be viewed as favourable by a city whose crime rate in the previous year was 1,000; it would be viewed as disastrous by a city whose previous year's rate was 300. We hope soon to be able to provide data on changes over time, but before we do so we would like to gauge the reaction to the indicators we have used here.

Indicators are peculiar in other respects too. For example, take the indicator "Number of Criminal Code Offenses per 10,000 Population". A low figure can mean (a) that the crime rate is actually low, or (b) that residents have so little confidence in their police force that they do not bother reporting minor crime, or (c) that what one community reports diligently, such as soliciting by prostitutes, another community does not see as a crime worth reporting, or (d) that the police do not bother recording all the crimes which have been reported. Further, the indicator does not reflect the gravity of the crimes reported: the Criminal Code covers a wide range of sins and all are given equal weight in the indicator. (Those who are interested in finer breakdowns than have been used here can find the information in Statistics Canada publications.) All of this provides an example of how easy it is to discredit an indicator. In view of these reservations, one might wonder why the Ministry of State for Urban Affairs is publishing these indicators for the 22 principal metropolitan areas of Canada.

First, we believe that a large number of Canadians who live in cities are curious about the way their community compares with others. We want to satisfy that curiosity. Further, receiving a reaction to the indicators is highly desirable, whatever form it takes. If someone proves that these statistics are inaccurate, that may show the way to improving their accuracy. If a municipality is dismayed at finding itself unfavourably compared with others, it might take measures to improve conditions. If someone comes up with a more accurate indicator of a particular condition, we would welcome having it brought to our attention.

If we are to disseminate information about urban life, we have to make a start. That start was made last year with the appearance of the first edition of the Ministry's *Urban Indicators*. This revised edition provides a next step along the path to a better informed urban Canada.

André Ouellet
Minister of State for Urban Affairs

INTRODUCTION

The aim of this study is straightforward: to provide comparative measures of some aspects of the quality of life in Canadian cities. In doing this, we hope to stimulate discussion about the potential of certain indicators for identifying urban problems and their usefulness for policy development and monitoring.

We do not pretend that the set of indicators we have used is comprehensive. This project is a first foray, so to speak, and we hope it serves as a catalyst for other work.

Thirty-six indicators are presented here, in the categories of social, economic and physical development. Urban areas are ranked from "best" to "worst" for each indicator. The same data are then plotted geographically from west to east, giving some indication of regional variations. Accompanying the presentation of data for each indicator, there is a brief discussion concerning what it measures, the shortcomings of the indicator as judged against a set of selection criteria, and suggestions for developing new indicators.

Before proceeding to the indicators themselves, we briefly examine the assumptions underlying the indicator concept and some possible uses for indicators. We also provide details concerning the selection criteria for particular indicators and general problems encountered in rigidly applying these criteria. The possibilities for future Ministry activity in this area are also elaborated. Some readers may prefer to go directly to the indicators and return later to the description of underlying assumptions. A technical appendix concludes the report.

The results of the study are analysed to see if the set of thirty-six indicators can be reduced to a smaller number, to test whether or not summary variables exist, and to show how the data might be more rigorously interpreted.

Since this is our first effort in this area, we would welcome comments addressed to Director, Human Environment Directorate, Ministry of State for Urban Affairs, Ottawa, K1A 0P6.

INTRODUCTION TO THE REVISED EDITION

This revised edition of *Urban Indicators* provides a slightly modified presentation of our statistical profiles of quality of life. We have attempted to improve the clarity of some measures and have added four new measures (numbers 24, 25, 30 and 31) as well as updating a few measures. The changes are modest and constitute a revision rather than a new edition.

The purpose of the report remains the same: to make available a basis for assessing some aspects of the quality of life in Canada's largest urban centres.

Human Environment Directorate, MSUA

WHAT IS AN URBAN INDICATOR?

An indicator points out something of interest about an object or process. An urban indicator, consequently, focuses on urban objects or urban processes. Since there are as many points of interest in urban life as there are concerned individuals, the selection of any one indicator inherently involves value judgements. For our purposes, an indicator measures quantitatively a key characteristic of the quality of urban life. Our assumption is that the key characteristics are generally thought to reflect major societal concerns.

Our study did not include the establishing of preferred ends (as an example, goals or objectives which stipulate a minimum level of water purity). Nor did the task include establishing performance indicators, which in any event would have required us to establish preferred ends. Simply put, we have used measures of "what is," not of "what should be" nor of changes towards "what should be."

WHY ARE URBAN INDICATORS USEFUL?

Notwithstanding the above limitations, urban indicators provide basic information about conditions in our cities. Thus, they make it possible for us to make choices as to what those cities should be. They provide a description of what is, as a prerequisite for influencing what will be. This implies a number of potential uses:

- monitoring conditions over time in order to identify improvement and deterioration in various key aspects of urban life;
- identifying problems which characterize specific cities;
- stimulating continuing discussion on the objectives of society and acceptable rates of progress towards these objectives;
- stimulating a search for more appropriate indicators and more useful ways of interpreting existing ones.

While the level of detail reflected in an urban indicator must be specific enough to focus on major areas of urban concern, it will not usually allow the evaluation of the effects of particular government programs. But although they paint too broad a picture to be of much use in measuring program costs relative to benefits, indicators can give a global picture of the conditions to which programs are addressed and can measure changes in those conditions.

WHY THESE PARTICULAR INDICATORS?

A number of quality-of-life indicators have been proposed in recent years. The few that have actually been developed derive from a variety of approaches and data sources.[1]

For example, *Perspective Canada: A Compendium of Social Statistics,* prepared by Statistics Canada in 1974, is intended to be "a statistical portrait of the Canadian people, their activities, and their environments."[2] A number of themes are developed which focus on the individual, are social rather than economic in content, and are at least minimally quantified.[3] However, as in any report limited to currently available data, indicators of "results" or "outputs" are not always possible. Instead statistics dealing with inputs, costs, and means have been used.

[1] Selected works in the area are listed in the suggested readings (page 106).
[2] Statistics Canada: *Perspective Canada: A Compendium of Social Statistics.* Ottawa: Information Canada, 1974, p. xxi.
[3] Ibid, p. xxii.

In contrast to this approach, the system of social indicators under development by the Organization for Economic Cooperation and Development takes as its starting point the definition of "primary goal areas." From these, more specific "social concerns" and "sub-concerns" are identified and eventually indicators are proposed. Such an approach may produce a comprehensive set of proposed indicators, but it is by no means certain that data currently exist or will eventually exist to measure these. Work published by the Economic Council of Canada appears to reflect roughly the same dilemma.[4]

Other approaches emphasize the subjective aspect of indicators, and attempt through surveys to measure perceived levels of satisfaction. This produces different indicators, requiring different data from the more comprehensive and objective approaches outlined above.

Although our approach is perhaps most similar to that of *Perspective Canada*, we have used an urban focus and have attempted to use indicators more selectively, according to pre-determined criteria. The indicators presented here were selected on the basis of five criteria:
(i) Comprehensiveness. The areas of concern include demographic characteristics, recreation, criminality, education, cultural opportunity, health, income, employment, housing, air quality, and transportation. Although we make no pretense that this listing is exhaustive, or even preferable to other possible listings, it does parallel frameworks established in a number of social indicator studies and approximates sectors of government activity.
(ii) Availability of data for the 22 Canadian census metropolitan areas (CMAs). In some cases, special tabulations were required to obtain data at this level, while in other cases potential indicators were eliminated because data were available only for major economic regions or for a province as a whole. Where it was necessary to aggregate from constituent municipalities, some data had to be reported for a smaller area than the entire census metropolitan area.In every case, however, the major city is included.

The original intent of the study was to go beyond comparison of metropolitan areas to comparisons of communities within the metropolis. Unfortunately, problems of definition between suburbs and the inner city, lack of disaggregated data in some cases and the amount of calculation and computation in others, made this impossible.
(iii) Reliability and accuracy. As far as possible, the quality of the data source was checked. Many possible indicators were excluded because of inconsistencies in definition of terms, inadequate sampling, or methodological problems.
(iv) Validity. It is important to establish what aspect of the quality of life an indicator measures and to select indicators which are both understandable and meaningful.
(v) Topicality. It is difficult to address oneself to current and future issues with outdated information. Given the conditions of existing data, however, this criterion remains largely unmet.

The thirty-six indicators are the result of applying these criteria to existing data. These indicators represent only one view of the quality of life in our metropolitan

[4] Henderson, D.W., *Social Indicators: A Rationale and Research Framework*. Economic Council of Canada, Ottawa: Information Canada, 1974.

areas. Thus the deficiencies and gaps in coverage are as important as the indicators themselves. Lack of good data at the metropolitan level in a number of areas — health, income, air quality, and land use, in particular — should raise questions about how far discussion of problems in these areas can proceed. Difficulties in interpreting the indicators presented here may reflect gaps in our understanding of what are the desirable and the undesirable qualities of urban life. Finally, questions about the appropriateness of our measures for evaluating the quality of life may stimulate discussion and lead to better indicators and alternative strategies for data collection.

HOW ARE INDICATORS INTERPRETED?

Indicators can be both used and abused. The format we have chosen for presenting data is intended to facilitate certain uses and at the same time to provide checks against abuses. Thus we rank metropolitan areas from "best" to "worst" and also provide graphic comparisons between broad geographical regions. In both instances, we have avoided setting out ideal conditions or preferred ends while permitting relative assessment of conditions in specific metropolitan areas. We have done this in order to focus debate.

In assessing relative conditions, we must be aware that all indicators have the inherent possibility of measurement error. Hence they should be interpreted as in order of magnitude even though specific values are given. Accordingly, a preferable basis for a city-to-city comparison is the comparison of one city with the average values for a number of other cities.

The graphic presentations should permit preliminary conclusions with respect to other criteria. Plotting relationships geographically is one approach to discovering underlying factors. Certain patterns may suggest the interplay of broad historic or cultural forces, or they may suggest that forces unique to one city are at play.

Another, perhaps more sophisticated, approach would be to test statistically the relationship between some burning policy issue and each urban indicator. For example, city size and growth may be strongly related (positively or negatively) to certain indicators of the quality of urban life. We undertook to examine these sorts of relationships, and concluded that there are few significant associations. Our results are in the Technical Appendix.

One other matter deserves attention. Do the thirty-six indicators measure independent aspects of the urban condition, or could fewer indicators serve the same purpose? Do "summary indicators" exist? The statistical tests that we used to answer this question show that, with few exceptions, the indicators are independent and hence measure different aspects of the quality of life. Again, the results of these tests are detailed in the Technical Appendix.

FUTURE DIRECTIONS

Our recommendations for future work derive from our experience in developing these indicators, and our review of work completed or underway in other federal departments or agencies.[5] Our experience suggests that since we found a scarcity of good, useful and readily accessible data for policy purposes, another

[5] Leon Beaudoin, *"Recherche du gouvernement fédéral en matière d'indicateurs de la qualité de la vie,"* (unpublished manuscript), Ministre d'État chargé des Affaires urbaines, October 22, 1974.

comprehensive urban indicators project is not yet justified. The indicators presented here represent fairly well the extent of consistent, comparable data now available for Canadian metropolitan areas. This is perhaps not surprising, since data is collected to satisfy specific sectoral needs rather than to provide answers to the more general concerns raised here.

If our work to date is to be useful for future application, existing indicators should be improved and new ones developed each year, in anticipation of emerging or shifting policy priorities. Steps which could be taken to improve our indicators include:

(i) Extension of coverage to intermediate and smaller communities. Data are available for intermediate and smaller communities for some, but not all, indicators. (It is possible, however, that some indicators are appropriate solely for assessing conditions in smaller cities and others solely for larger cities.)

(ii) Extension of within-city coverage. Conditions may vary as much within a given city as between cities, if not more. This is assuredly the case, for example, with socio-economic distribution, where there is a significantly lower socio-economic level in the inner cities than in the suburbs.

(iii) Addition of a temporal dimension. The way in which conditions change over time is of great interest. Annual reports would be satisfactory for most purposes, providing that they are up-to-date.

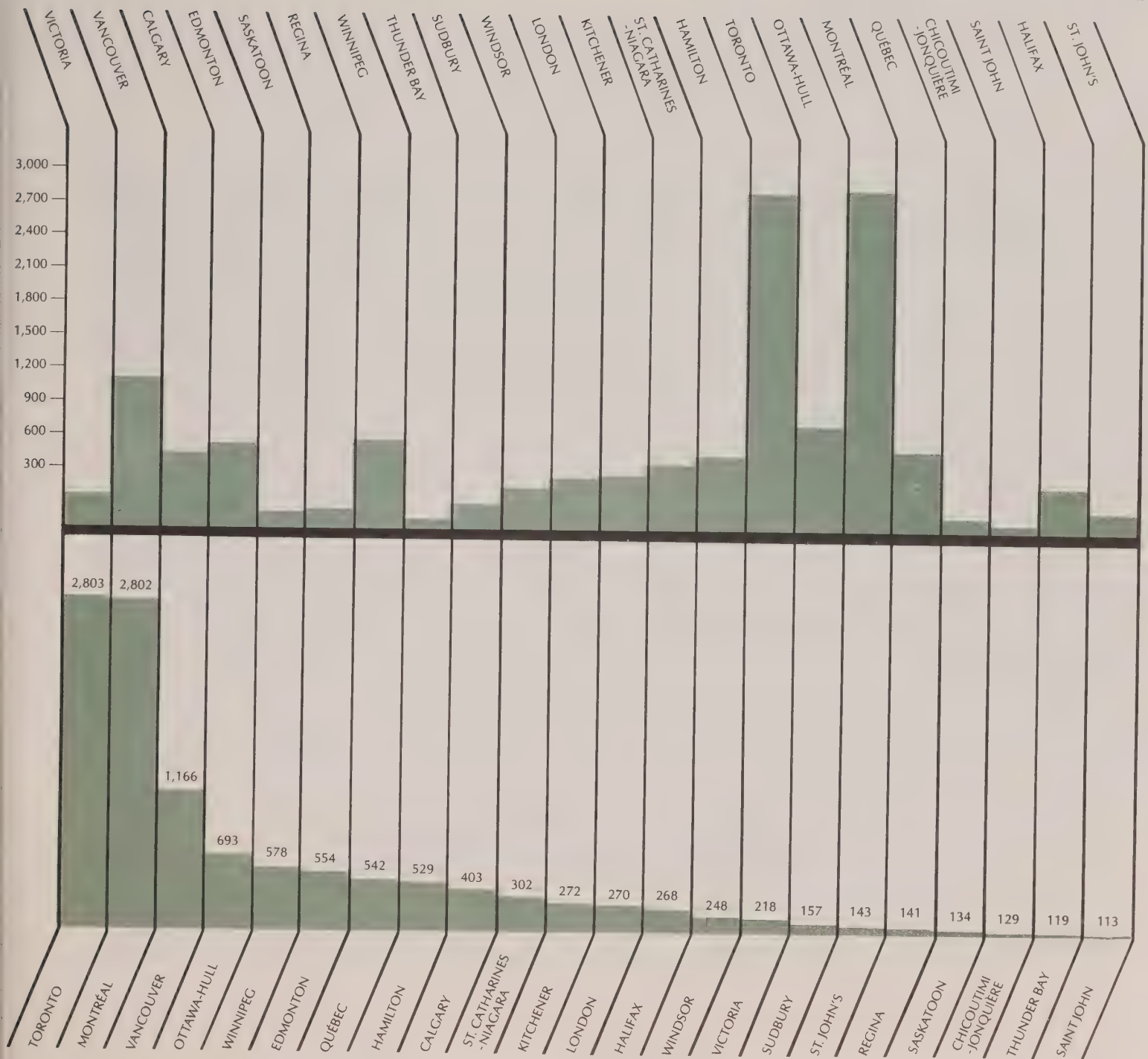
(iv) Standardizing data for demographic structure, employment structure, etc. Differences on some indicators may be accounted for by differences in the underlying demographic or industrial structure rather than more complex socio-economic or attitudinal factors. For example, criminal offense rates are much higher for persons aged 15 to 34 than for other age-groups. The proportion of population in this age-group may vary by city and higher rates of criminality may reflect only this factor. Data should be standardized to take account of this.

(v) Adding national, urban and metropolitan averages. Averages (arithmetic mean or median) are summary measures which can be readily applied in making comparisons. As reference points, they facilitate comparison without encouraging non-productive debate on the condition of city X relative to city Y.

Improving and maintaining the existing urban indicators is a starting point for constructing a more comprehensive set of indicators. First, the reconsideration of relevant data sources should uncover new indicators. Second, a longer-range project will facilitate contact with other agencies undertaking similar projects. Third, it is possible to develop further new urban indicators by each year selecting one or two sectors of greatest concern for improving the quality of urban life.

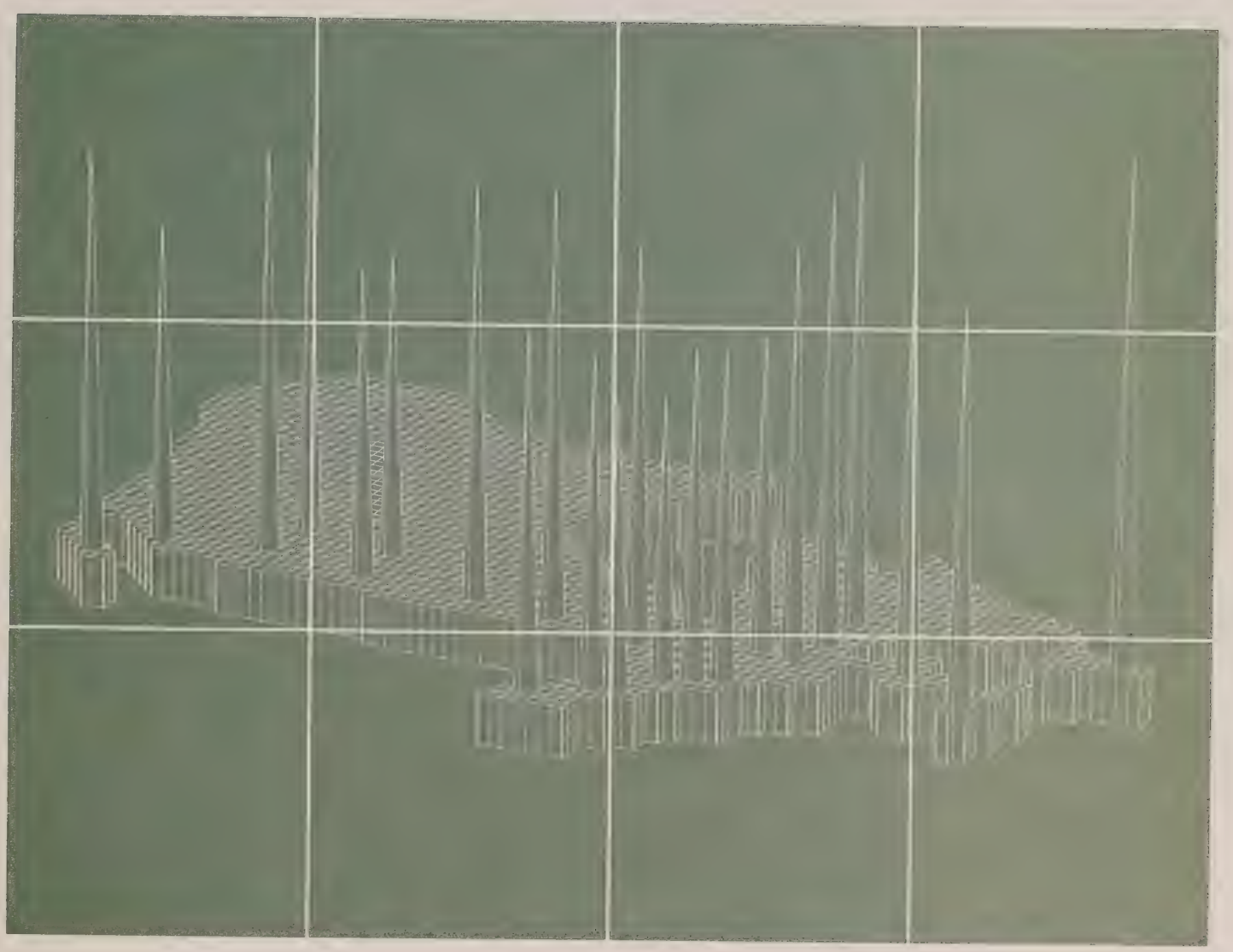
In the following tables, the score for each of the 22 CMAs on each of the indicators is shown graphically. The upper graph shows the cities in geographic order, from west to east; the lower graph shows them in the order of magnitude of their scores.

In a few cases (#9, 23, 34, 35), data were not available for some cities. This is indicated by the symbol †. Explanations of the measures used are provided on the pages opposite the graphs.



*A census metropolitan area is defined generally as the main labour market area that includes and surrounds a continuous built-up area, where the latter has a population of 100,000 or more.

SOCIAL DEVELOPMENT

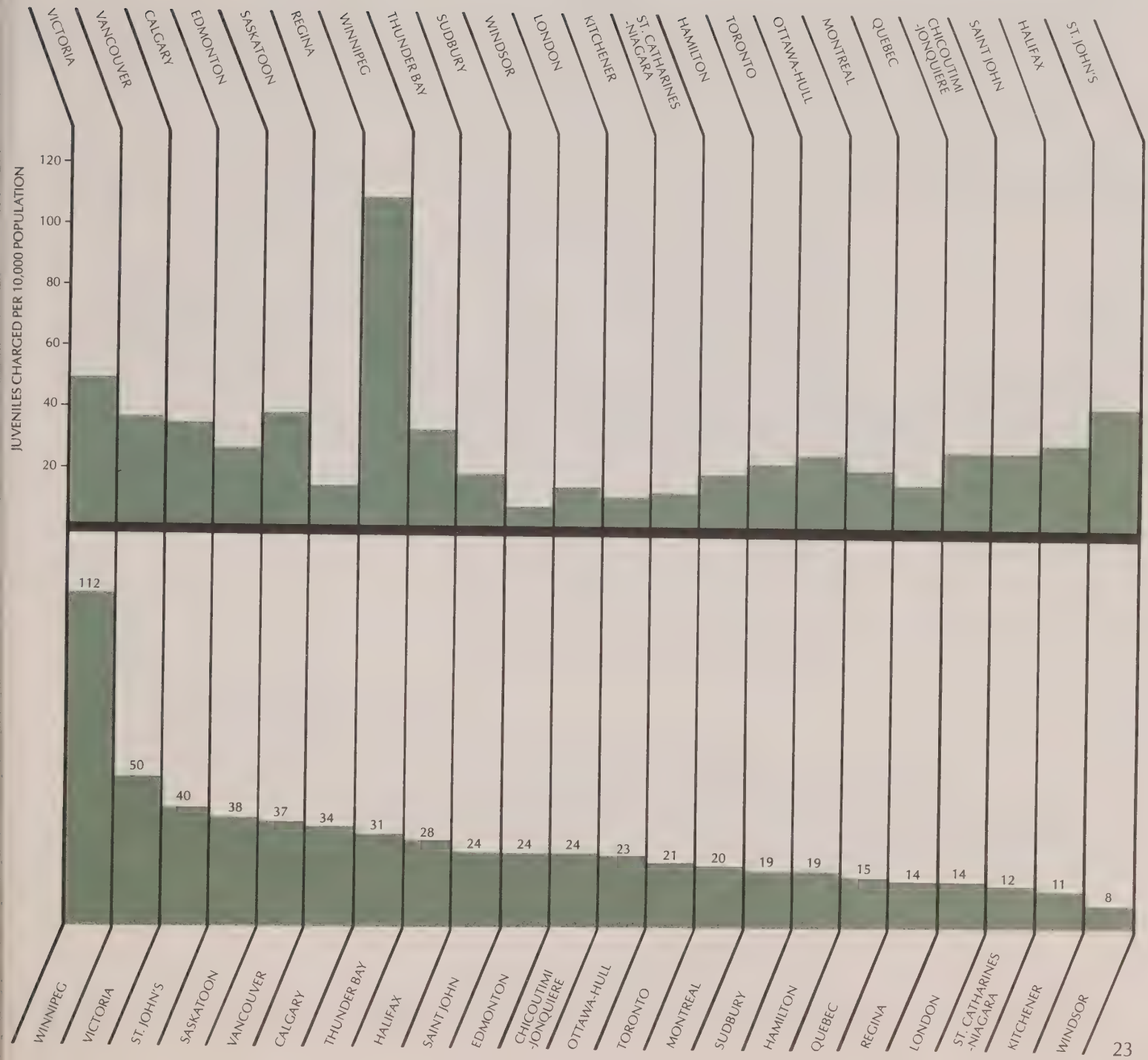


1. JUVENILES CHARGED

ASPECT MEASURED	The number of juveniles charged reflects criminality within that particular sector of the population. Juvenile crime may also indicate family problems and the need for treatment and services at that level. The juvenile population includes those aged 7 to 15, adjusted for those provinces where the juvenile age limit was either under 17 or under 18 years of age.
CONSIDERATION OF THE MEASURE	1. AREA COVERAGE The data are collected by the police force in each municipality and consequently the area covered is that of the jurisdiction of the local police force. This will usually be the major city or major cities within the census metropolitan area. 2. TEMPORAL COVERAGE Police statistics are gathered annually. 3. OTHER COVERAGE INCOMPATIBILITIES Reporting is done on the basis of the Uniform Crime Reporting System, based on common definitions. The quality and comparability of the data are consequently dependent on the extent to which local police statistics are accurately recorded in the standardized terms. Variations in reporting of offenses by citizens and by police may also exist between CMAs. No account has been taken of the differing percentage of juveniles in individual major urban areas. This could be estimated to better reflect the number of offenses among the population of concern. 4. COLLECTION Police departments send monthly crime statistics returns to Statistics Canada, which publishes annual totals in Catalogue 85-205. 5. COMPUTATION Figures are taken directly from published data.
OTHER MEASURES	Rates of juveniles charged can be specified for particular types of crime. It is also possible to consider correctional institutions for juveniles and the consequences of conviction and sentencing as found in Catalogues 85-202 and 85-208.

SOURCE:
Statistics Canada Crime Statistics: Police 1971, Catalogue 85-205, 1973.

NUMBER OF JUVENILES CHARGED WITH CRIMINAL CODE OFFENSES PER 10,000 POPULATION (1971)



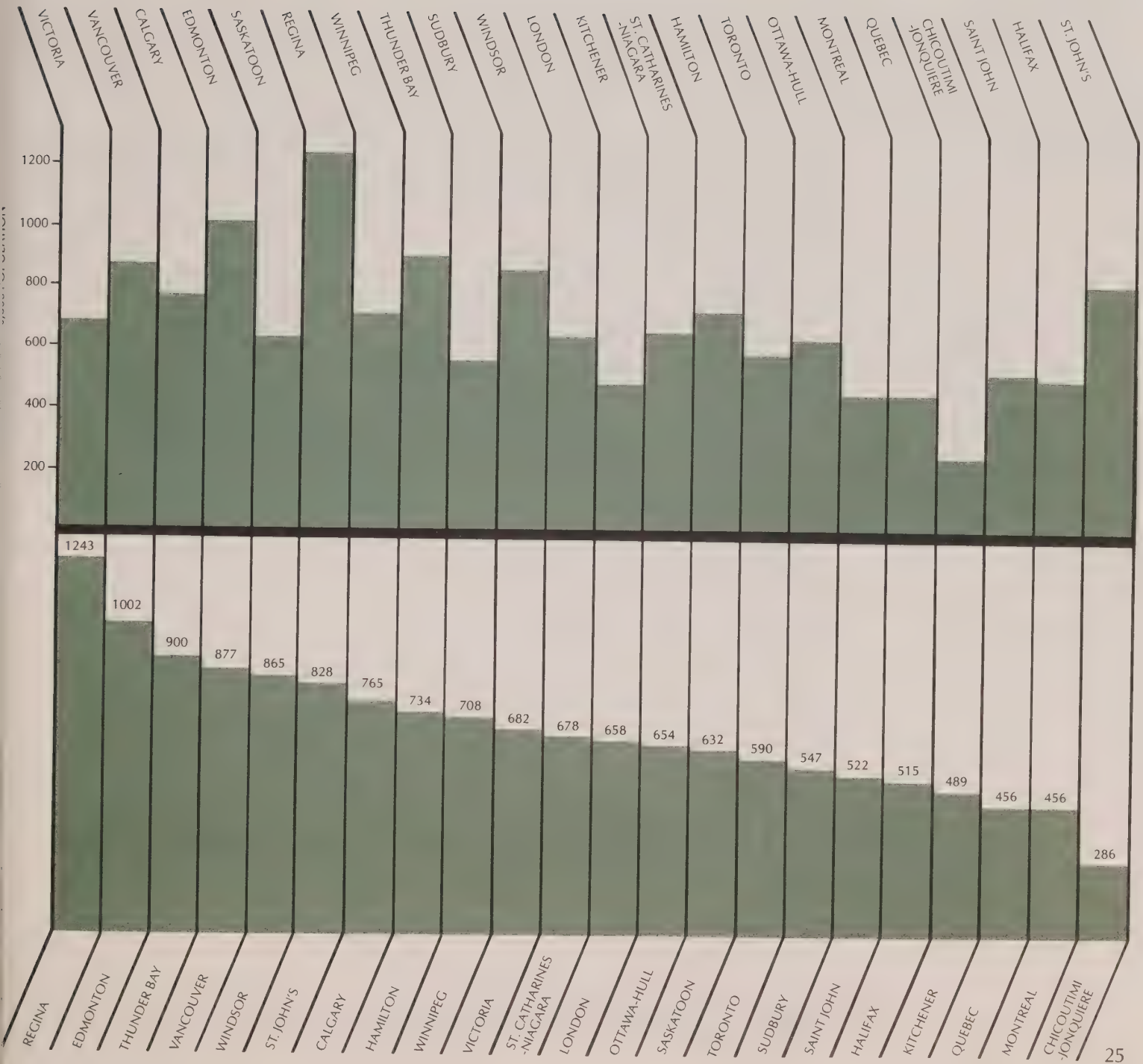
2. CRIMINAL CODE OFFENSES

ASPECT MEASURED	Rate of criminal code offenses is a general indicator of crime committed. It is based on the number of incidents reported to the police and includes most major crimes against persons and property.[1] It represents the overall level of unlawful activity in a city more than it represents the likelihood of crimes committed against any single individual.
CONSIDERATION OF THE MEASURE	1. AREA COVERAGE The data are collected by the police force in each municipality and consequently the area covered is that of the jurisdiction of the local police force. This will usually be the major city or major cities within the census metropolitan area. 2. TEMPORAL COVERAGE Police statistics are gathered annually. 3. OTHER COVERAGE INCOMPATIBILITIES Reporting is done on the basis of the Uniform Crime Reporting System, based on common definitions. The quality and comparability of the data are consequently dependent on the extent to which local police statistics are accurately recorded in the standardized terms. Variations in reporting of offenses by citizens and by police may also exist between cities. Rates of offenses are known to vary with age-group, but account has not been taken of variations in age structure by major urban area. Estimates of these could be obtained, however. 4. COLLECTION Police departments send monthly crime statistics returns to Statistics Canada, which publishes annual totals in Catalogue 85-205. 5. COMPUTATION Figures are taken directly from published data divided by 1971 census populations.
OTHER MEASURES	Rates for specific offenses can be used to emphasize types of crime, as for example against property or persons. These are not broken down in the published data for major urban area. It would, however, be instructive to compare rates of violent crimes for different cities and even for the core and suburbs of individual cities. As mentioned above, the data should be standardized for age structure.

[1] These include murder, attempted murder, manslaughter, rape, other sexual offenses, wounding, assault, robbery, breaking and entering, motor vehicle theft, theft over $50, theft $50 and under, possession of stolen goods, fraud, prostitution, gaming and betting, use or possession of offensive weapons, and other criminal code offenses.

SOURCE:
Statistics Canada Crime Statistics: Police 1971, Catalogue 85-205, 1973.

NUMBER OF CRIMINAL CODE OFFENSES
PER 10,000 POPULATION (1971)

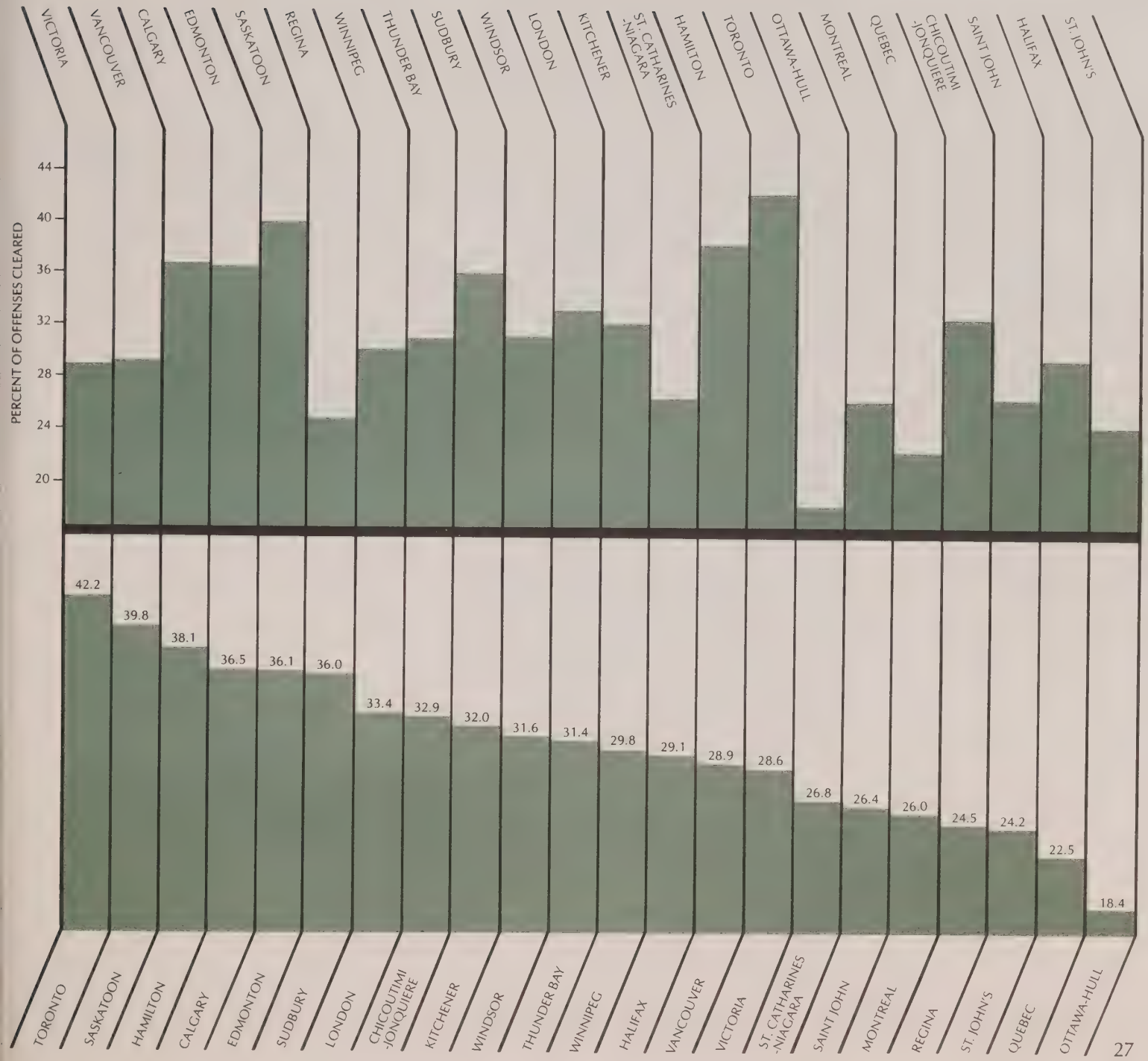


3. OFFENSES CLEARED

ASPECT MEASURED	The percentage of offenses cleared is to a large extent a measure of the effectiveness of local police forces. Offenses are usually cleared as a result of a charge being laid.[1] Thus the measure reflects the extent to which crimes are resolved.	
CONSIDERATION OF THE MEASURE	1. AREA COVERAGE The data are collected by the police force in each municipality and consequently the area covered is that of the jurisdiction of the local police force. This will usually be the major city or major cities within the census metropolitan area. 2. TEMPORAL COVERAGE Police statistics are gathered annually. 3. OTHER COVERAGE INCOMPATIBILITIES Reporting is done on the basis of the Uniform Crime Reporting System, based on common definitions. The quality and comparability of the data are consequently dependent on the extent to which local police statistics are accurately recorded in the standardized terms. Variations in reporting of offenses by citizens and by police may also exist between CMAs. Crimes against property (theft, breaking and entering) have particularly low probabilities of being cleared. Thus cities with a high percentage of these types of crimes will tend to have lower percentages of offenses cleared. Differences in the distribution of types of crime among CMAs may consequently account for some of the variation in clearing.	4. COLLECTION Police departments send monthly crime statistics returns to Statistics Canada, which publishes annual totals in Catalogue 85-205. 5. COMPUTATION Figures are compiled directly from published data.
OTHER MEASURES	CMAs could be compared according to percentages of offenses cleared for specific crimes to increase comparability. Data were not readily available for reporting specific crime categories such as violent crimes. It is also possible to follow the process further and consider the court results of charges laid in terms of convictions and sentences.	

[1] An offense is cleared either when a charge has been laid or when there is reasonable proof that the offender has been identified, although no charge may be laid due to such factors as the offender being outside police jurisdiction, death of the offender, etc.

SOURCE:
Statistics Canada Crime Statistics: Police 1971, Catalogue 85-205, 1973.


PERCENT OF OFFENSES CLEARED
44
40
36
32
28
24
20
VICTORIA
VANCOUVER
CALGARY
EDMONTON
SASKATOON
REGINA
WINNIPEG
THUNDER BAY
SUDBURY
WINDSOR
LONDON
KITCHENER
ST. CATHARINES -NIAGARA
HAMILTON
TORONTO
OTTAWA-HULL
MONTREAL
QUEBEC
CHICOUTIMI -JONQUIERE
SAINT JOHN
HALIFAX
ST. JOHN'S
42.2
39.8
38.1
36.5
36.1
36.0
33.4
32.9
32.0
31.6
31.4
29.8
29.1
28.9
28.6
26.8
26.4
26.0
24.5
24.2
22.5
18.4
TORONTO
SASKATOON
HAMILTON
CALGARY
EDMONTON
SUDBURY
LONDON
CHICOUTIMI -JONQUIERE
KITCHENER
WINDSOR
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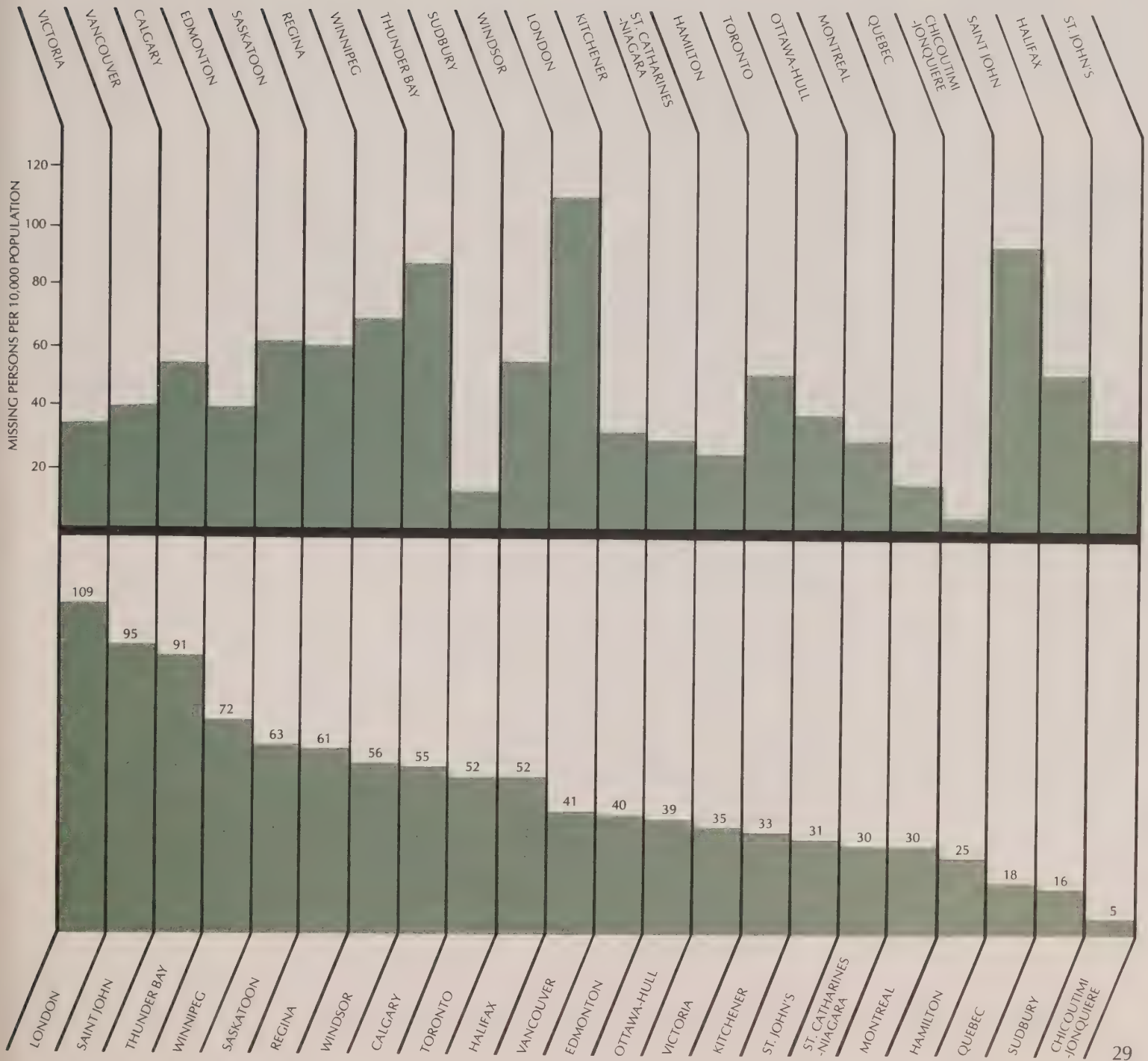
SAINT JOHN
MONTREAL
REGINA
ST. JOHN'S
QUEBEC
OTTAWA-HULL

4. MISSING PERSONS

ASPECT MEASURED	The number of missing persons is a measure of social and family disorganization and of the existence of social problems. Missing persons tend to be juvenile runaways or spouses who have left their families, and in each case reflect a disruption of social relationships.	
CONSIDERATION OF THE MEASURE	1. AREA COVERAGE The data are collected by the police force in each municipality and consequently the area covered is that of the jurisdiction of the local police force. This will usually be the major city or major cities within the census metropolitan area. Consequently the area coverage can vary substantially. 2. TEMPORAL COVERAGE Police statistics are gathered annually. 3. OTHER COVERAGE INCOMPATIBILITIES Reporting is done on the basis of the Uniform Crime Reporting System, based on common definitions. The quality and comparability of the data are consequently dependent on the extent to which local police statistics are accurately recorded in the standardized terms. Variations in reporting of offenses by citizens and by police may also exist between CMAs. No account has been taken here of differing age structures by major urban areas. This could be estimated.	4. COLLECTION Police departments send monthly crime statistics returns to Statistics Canada, which publishes annual totals in Catalogue 85-205. 5. COMPUTATION Figures are taken directly from published data.
OTHER MEASURES	Social and family disorganization may also be reflected in other measures of family disruption such as divorce, incidence of single-parent families, and family court cases. Social disorganization in its extreme forms may be reflected in suicide rates and admissions to mental institutions, although data on these are not comparable, due to differences in reporting and availability of facilities, respectively.	

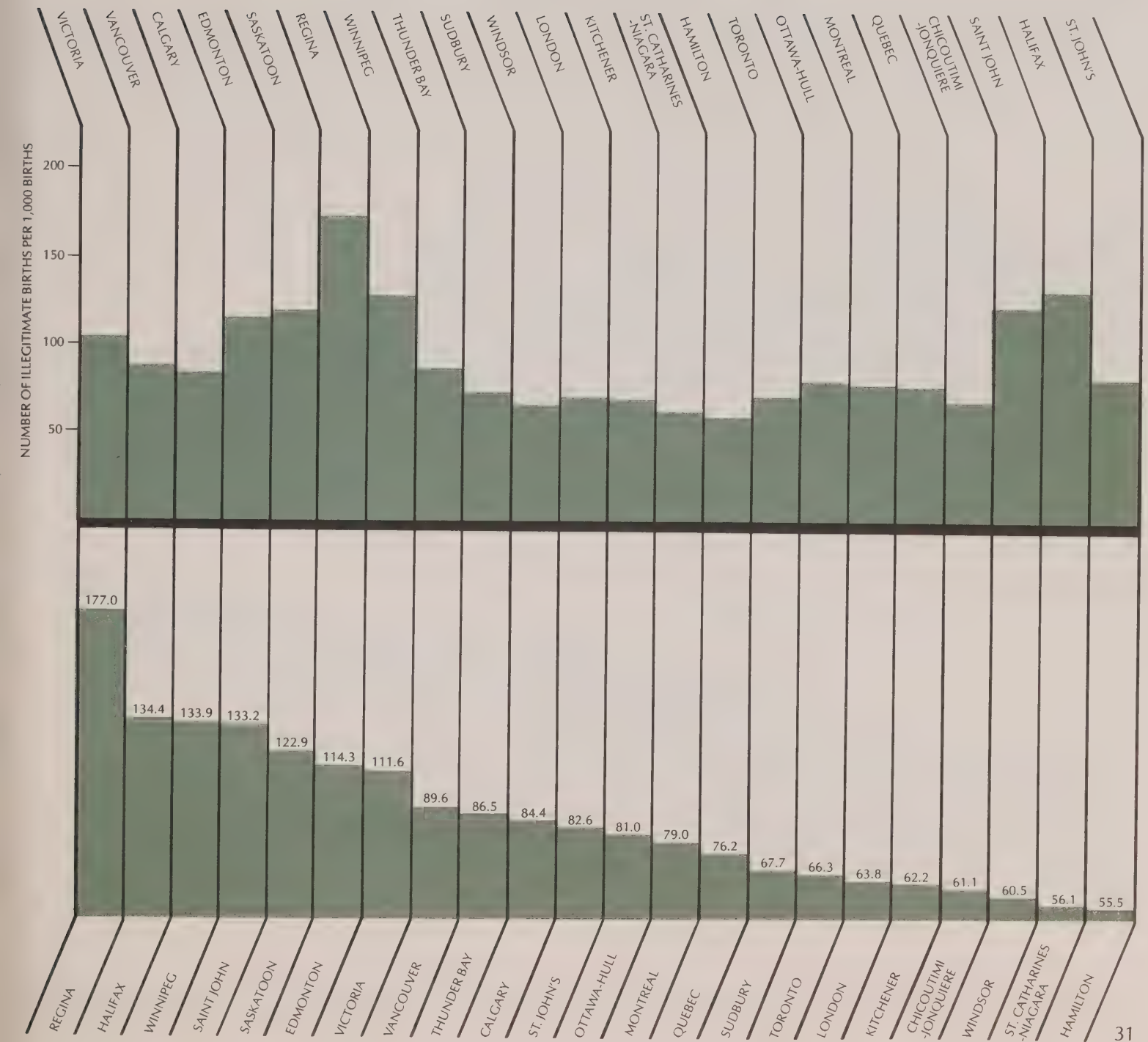
SOURCE:
Statistics Canada Crime Statistics: Police 1971, Catalogue 85-205, 1973.


MISSING PERSONS PER 10,000 POPULATION
120
100
80
60
40
20
VICTORIA
VANCOUVER
CALGARY
EDMONTON
SASKATOON
REGINA
WINNIPEG
THUNDER BAY
SUDBURY
WINDSOR
LONDON
KITCHENER
ST. CATHARINES -NIAGARA
HAMILTON
TORONTO
OTTAWA-HULL
MONTREAL
QUEBEC
CHICOUTIMI -JONQUIERE
SAINT JOHN
HALIFAX
ST. JOHN'S
109
95
91
72
63
61
56
55
52
52
41
40
39
35
33
31
30
30
25
18
16
5
LONDON
SAINT JOHN
THUNDER BAY
WINNIPEG
SASKATOON
REGINA
WINDSOR
CALGARY
TORONTO
HALIFAX
VANCOUVER
EDMONTON
OTTAWA-HULL
VICTORIA
KITCHENER
ST. JOHN'S
ST. CATHARINES -NIAGARA
MONTREAL
HAMILTON
QUEBEC
SUDBURY
CHICOUTIMI -JONQUIERE

5. ILLEGITIMACY

ASPECT MEASURED	The number of illegitimate births reflects the extent of social disorder in that it may indicate a lack of the usual family structure. While it is not certain that illegitimate children will lack the presence of a father, it is likely that this will be the case. It can be expected that problems will arise in providing for the needs of such children, with resultant demands on the social welfare system in the cities affected.	
CONSIDERATION OF THE MEASURE	1. AREA COVERAGE Data are available for CMAs and other major urban areas, as well as at the provincial and census division level. 2. TEMPORAL COVERAGE Data are collected annually, and are available in August for the preceding year. 3. OTHER COVERAGE INCOMPATIBILITIES The definition of "illegitimate" used in the data presented here has some inconsistencies. Children are illegitimate if no legal father, i.e. a husband of the mother, is named. If the mother is unwed at the time of birth but intends to marry and the father agrees to be named as a parent, the child is considered legitimate. If the mother is married, but claims the child to be the offspring of a man other than her husband, the legitimacy of the child depends on the willingness of the husband to accept the child into his household. Additionally, certain provinces interpret the definition differently. In the future, only the marital status of the mother will be recorded, making the definition of "illegitimate" more objective, but less precise. Because they are recorded at the hospital, the data reflect place of birth of the child, not necessarily the place of residence of the mother.	4. COLLECTION The data are collected by local registrars and forwarded to the provinces, who in turn supply Statistics Canada. Data at the provincial and census division level are published in Catalogue 84-204. CMA and major urban area data are compiled but not published. 5. COMPUTATION The computation is a simple ratio of illegitimate births to total births, the latter from the same source.
OTHER MEASURES	This indicator reflects only the circumstances of births of illegitimate children, and nothing of the subsequent conditions of life. Data on children placed under the care of Children's Aid societies and in foster homes would provide a better view of the consequences of illegitimacy. Other indicators of social cohesion and order are not readily available.	

SOURCE:
Statistics Canada Vital Statistics Section, Unpublished Data.

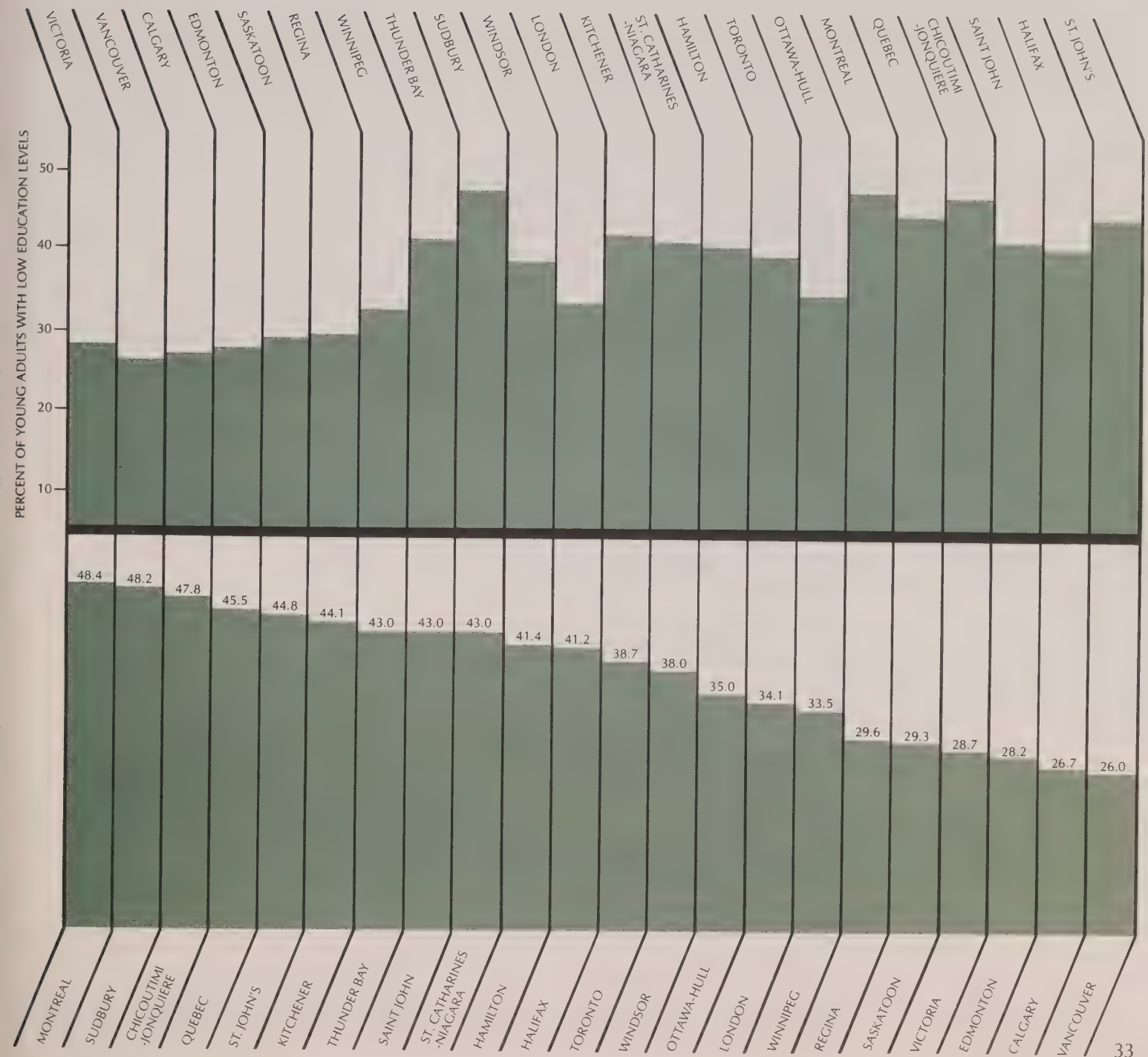

NUMBER OF ILLEGITIMATE BIRTHS PER 1,000 BIRTHS
200
150
100
50
VICTORIA
VANCOUVER
CALGARY
EDMONTON
SASKATOON
REGINA
WINNIPEG
THUNDER BAY
SUDBURY
WINDSOR
LONDON
KITCHENER
ST. CATHARINES -NIAGARA
HAMILTON
TORONTO
OTTAWA-HULL
MONTREAL
QUEBEC
CHICOUTIMI -JONQUIERE
SAINT JOHN
HALIFAX
ST. JOHN'S
177.0
134.4
133.9
133.2
122.9
114.3
111.6
89.6
86.5
84.4
82.6
81.0
79.0
76.2
67.7
66.3
63.8
62.2
61.1
60.5
56.1
55.5
REGINA
HALIFAX
WINNIPEG
SAINT JOHN
SASKATOON
EDMONTON
VICTORIA
VANCOUVER
THUNDER BAY
CALGARY
ST. JOHN'S
OTTAWA-HULL
MONTREAL
QUEBEC
SUDBURY
TORONTO
LONDON
KITCHENER
CHICOUTIMI -JONQUIERE
WINDSOR
ST. CATHARINES -NIAGARA
HAMILTON

6. EDUCATIONAL LEVEL

ASPECT MEASURED	This education indicator measures the proportion of people in each city who do not possess the usual educational requirements for obtaining employment. The 20-34 age-group is emphasized because it is these people who tend not to have the years of experience that might offset their lack of education. With no more than a grade 10 education, it is likely that this group will have difficulty finding satisfactory employment in urban areas. More generally, it is likely that lack of education will inhibit people from participating fully in activities within their communities.
CONSIDERATION OF THE MEASURE	1. AREA COVERAGE In addition to the 22 CMAs, data are available at the level of the provinces. 2. TEMPORAL COVERAGE Data are collected for census years only. 3. OTHER COVERAGE INCOMPATIBILITIES None are readily apparent. 4. COLLECTION The data are collected by Statistics Canada as part of the census and published in 1971 Census of Canada Catalogue 92-743, 1974. 5. COMPUTATION The computation is a straightforward percentaging of those with grade 10 education or less over the total number of persons for whom data exist.
OTHER MEASURES	This measure focuses on those people with less than average education. It is also possible to compare percentages of those who are highly educated. Median education level is difficult to compute because the highest and lowest categories are not finite (for example the lowest category is those having less than grade 8).

SOURCE:
Statistics Canada, 1971 Census of Canada, Unpublished Tabulations.

EDUCATIONAL LEVEL: PERCENTAGE OF POPULATION AGED 20-34, NOT PRESENTLY IN SCHOOL, WITH GRADE 10 EDUCATION OR LESS (1971)



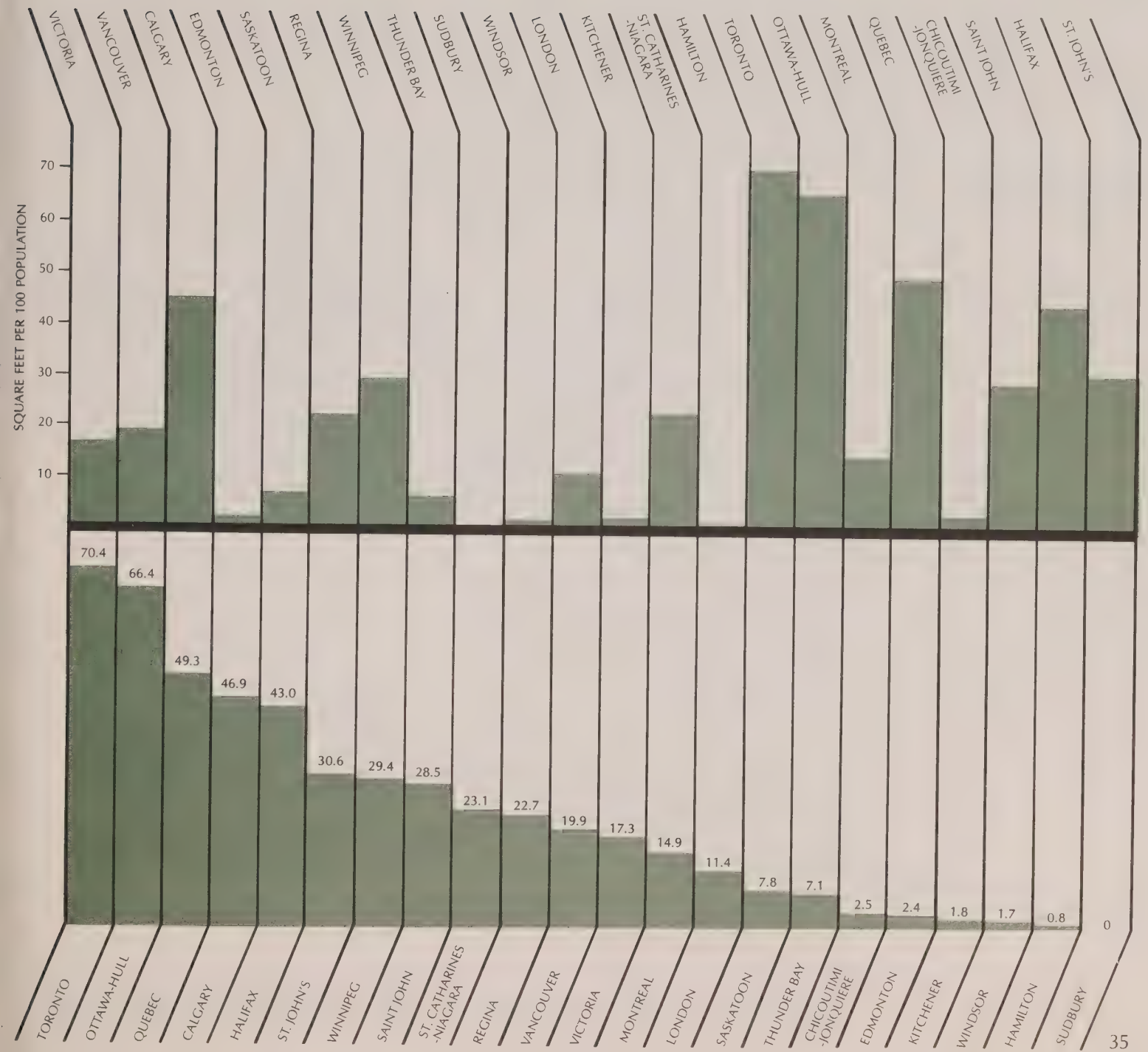
7. CULTURAL FACILITIES

ASPECT MEASURED	The area per 100 population of exhibition halls, museums and art galleries is a measure of the cultural and artistic opportunities offered by each metropolitan area.[1] For the purposes of the Recreation Canada survey, these facilities were defined as follows: a) Museum: Public exhibition area for historical artifacts or specialized displays of particular aspects of culture: art, science, technology, etc. This exhibition primarily serves educational ends. The museum usually collects works and objects, repairs them (if necessary) and exhibits them to the public.	b) Art gallery: Area specializing in the public exhibition of art objects for sale. c) Exhibition hall: Area used for a limited time to exhibit collections of works or objects for promotion purposes: e.g. exhibition halls in which there are annual auto shows, displays of camping equipment, fashion shows, etc. Only the interior space within such facilities is considered here.
CONSIDERATION OF THE MEASURE	1. AREA COVERAGE The data were collected by Recreation Canada for 1,800 municipalities which have been aggregated here to approximate the census metropolitan areas. 2. TEMPORAL COVERAGE No continual collection of data exists or is foreseen. The data were collected for the purposes of a single study which is now complete. The data could be updated with provincial cooperation and made available on a regular basis. 3. OTHER COVERAGE INCOMPATIBILITIES The interior area of the facility includes the walking area as well as the exhibition area and it is quite likely that this may include many areas which add little to the cultural value of such expositions. 4. COLLECTION The data were collected by teams of field researchers in each of the provinces and coordinated by Recreation Canada in Ottawa.	5. COMPUTATION The data on exhibition halls, museums and art galleries were aggregated from the Recreation Canada municipalities to approximate the population in each of the 22 CMAs, and divided by the 1971 population of the CMA approximations.
OTHER MEASURES	The Recreation Canada study also provides data on exhibition halls, museums and art galleries administered by non-governmental and private organizations.	

[1] Includes only facilities administered by federal, provincial, regional or municipal governments.

SOURCE:
Recreation Canada, National Study on the Supply and Demand for Sports and Recreational Facilities, Phase II: Inventory of Socio-Cultural Facilities, Special Tabulation, 1974.

CULTURAL FACILITIES: AMOUNT OF INDOOR SPACE IN EXHIBITION HALLS, MUSEUMS AND ART GALLERIES PER 100 POPULATION (1972)

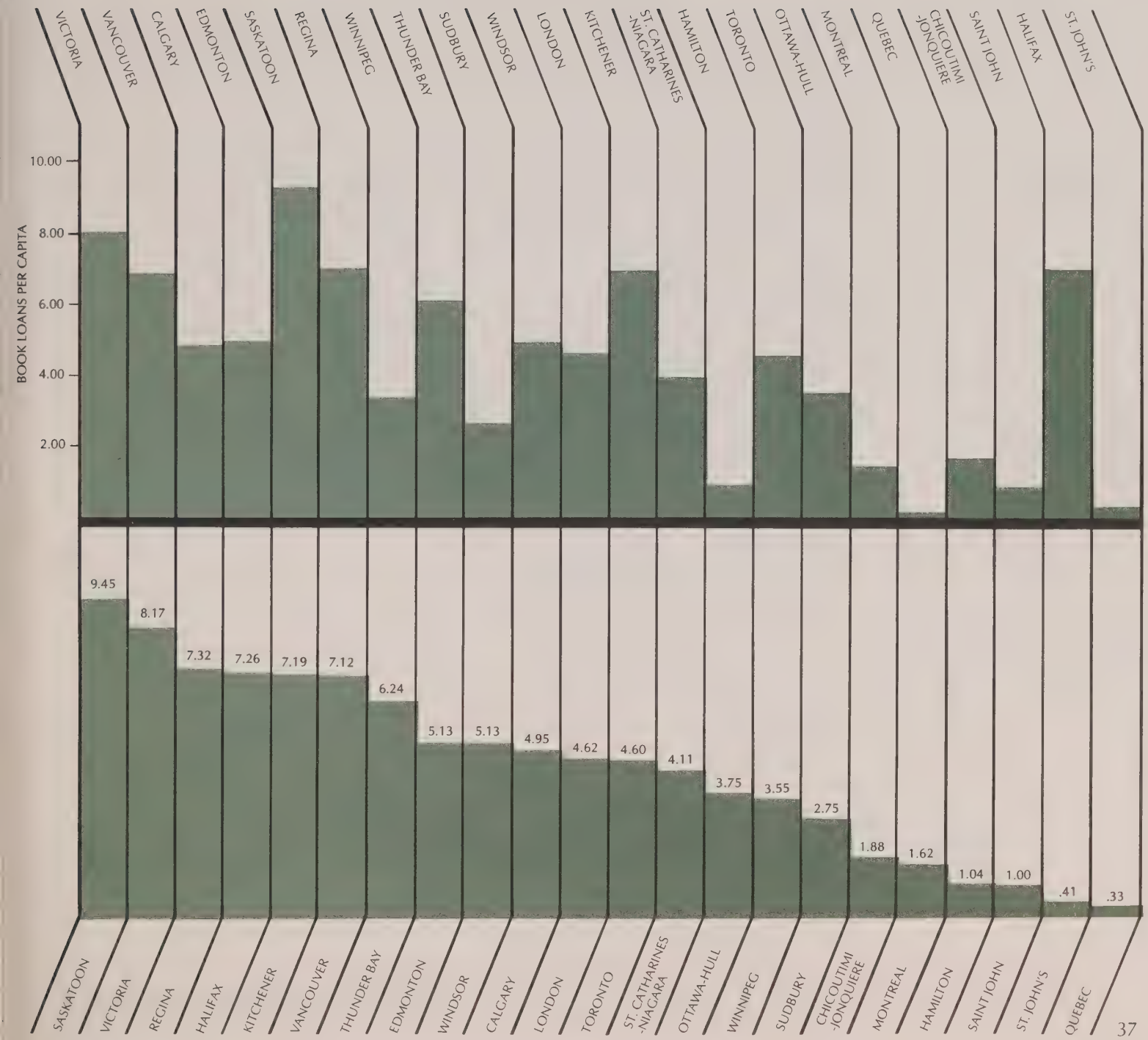


8. PUBLIC LIBRARY USAGE

ASPECT MEASURED	The number of books loaned per capita provides a measure of the interest in reading of the population of each CMA. Loans reflect both the availability of library books and libraries and the extent to which they are used. Since the indicator comprises municipal and regional libraries only, it is primarily a measure of recreation library usage by the general public.[1]	
CONSIDERATION OF THE MEASURE	1. AREA COVERAGE The data were collected by Recreation Canada for 1,800 municipalities which have been aggregated here to approximate the census metropolitan areas. 2. TEMPORAL COVERAGE No continual collection of data exists or is foreseen. The data were collected for the purposes of a single study which is now complete. The data could be updated with provincial cooperation and made available on a regular basis. 3. OTHER COVERAGE INCOMPATIBILITIES While this measure reflects the number of loans made, it is impossible to identify whether these tend to be the same books loaned repeatedly or different books borrowed from an extensive collection. Thus the measure does not reflect the range of choice. It is also possible that books may have been obtained through inter-library loans from non-public institutions.	4. COLLECTION The data were collected by teams of field researchers in each of the provinces and coordinated by Recreation Canada in Ottawa. 5. COMPUTATION The data on books loaned were aggregated from the Recreation Canada municipalities to approximate the population in each of the 22 CMAs and divided by the 1971 population of the CMA approximations.
OTHER MEASURES	The Recreation Canada study also provides data on libraries operated by other public and private organizations, such as educational institutions, religious groups, etc. It is also possible to look at data on number of books, periodicals and childrens' books owned by libraries. Data collected by the same study provide an inventory of a number of other "socio-cultural facilities" including: art galleries, auditoria (cinema, theatre, concert), exhibition halls, social meeting establishments, multi-purpose halls, museums, and studios.	

[1] Includes only regional and municipal public libraries. Specialized libraries in universities and government offices are excluded, as well as national and provincial archives.

SOURCE:
Recreation Canada, National Study on the Supply and Demand for Sports and Recreational Facilities, Phase II: Inventory of Socio-Cultural Facilities, Special Tabulation, 1974.


BOOK LOANS PER CAPITA
10.00
8.00
6.00
4.00
2.00
VICTORIA
VANCOUVER
CALGARY
EDMONTON
SASKATOON
REGINA
WINNIPEG
THUNDER BAY
SUDBURY
WINDSOR
LONDON
KITCHENER
ST. CATHARINES -NIAGARA
HAMILTON
TORONTO
OTTAWA-HULL
MONTREAL
QUEBEC
CHICOUTIMI -JONQUIERE
SAINT JOHN
HALIFAX
ST. JOHN'S
9.45
8.17
7.32
7.26
7.19
7.12
6.24
5.13
5.13
4.95
4.62
4.60
4.11
3.75
3.55
2.75
1.88
1.62
1.04
1.00
.41
.33
SASKATOON
VICTORIA
REGINA
HALIFAX
KITCHENER
VANCOUVER
THUNDER BAY
EDMONTON
WINDSOR
CALGARY
LONDON
TORONTO
ST. CATHARINES -NIAGARA
OTTAWA-HULL
WINNIPEG
SUDBURY
CHICOUTIMI -JONQUIERE
MONTREAL
HAMILTON
SAINT JOHN
ST. JOHN'S
QUEBEC

ASPECT MEASURED

The area per capita of commercial meeting establishments provides a measure of the opportunities for entertainment in each CMA.[1] These establishments are primarily ones which serve alcoholic beverages. Such places include taverns, lounges, night clubs, discotheques, and dance halls.

CONSIDERATION OF THE MEASURE

1. AREA COVERAGE
The data were collected by Recreation Canada for 1,800 municipalities which have been aggregated here to approximate the census metropolitan areas. No data were collected for the province of Quebec.[2]
2. TEMPORAL COVERAGE
No continuous collection of data exists or is foreseen. The data were collected for the purposes of a single study which is now complete. The data could be updated with provincial cooperation and made available on a regular basis.
3. OTHER COVERAGE INCOMPATIBILITIES
It is extremely difficult to classify within a single category such a wide variety of social meeting establishments. Differences in liquor laws between provinces and the types of establishments common to each make comparisons difficult. As stated above, data were unavailable for the province of Quebec.
4. COLLECTION
The data were collected by teams of field researchers in each of the provinces and coordinated by Recreation Canada in Ottawa. Information concerning social meeting establishments can be obtained from specific government departments, such as liquor licensing boards.
5. COMPUTATION
The data on social meeting establishments were aggregated from the Recreation Canada municipalities to approximate the population in each of the 19 CMAs and divided by the 1971 population of the CMA approximations. An adjustment was made for Ottawa since data for Hull were unavailable.

OTHER MEASURES

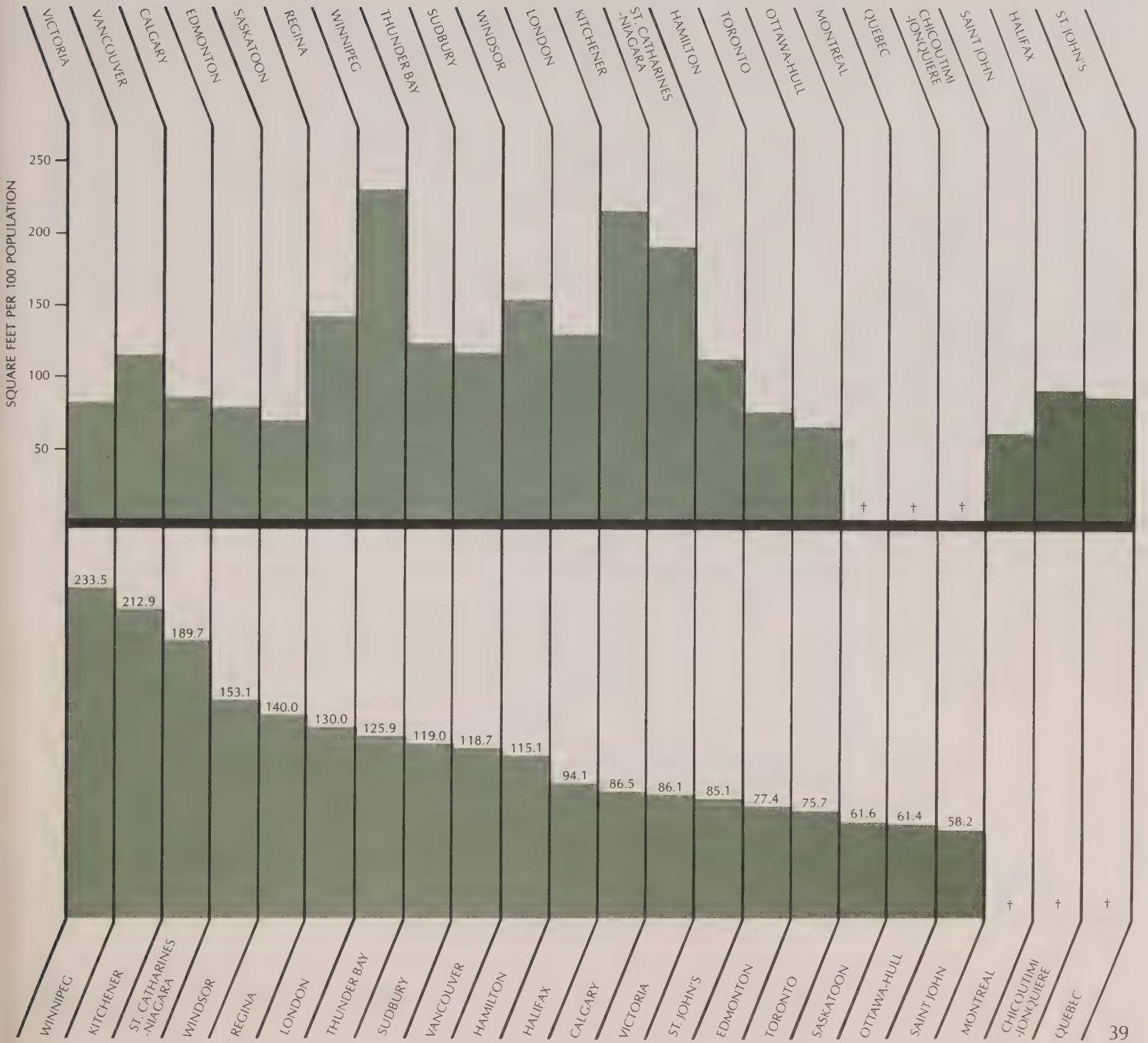
It is difficult to separate the establishments included in the measure into those which serve alcoholic beverages, those which have entertainment or dance floors and so on, because these facilities are often combined in the same establishment.

Data collected by the same study provide an inventory of a number of other "socio-cultural facilities" including: art galleries, auditoria (cinema, theatre, concert), exhibition halls, libraries, multi-purpose halls, museums, and studios. It is also possible to obtain data on the number of works belonging to both public and private museums and galleries as well as wall area available for exhibitions.

[1] Commercial meeting establishments, such as taverns, lounges, discotheques and dance halls, are primarily ones which serve alcoholic beverages.
[2] Hence, data for the Ottawa-Hull CMA does not include Hull and its environs.

SOURCE:
Recreation Canada, National Study on the Supply and Demand for Sports and Recreational Facilities, Phase II: Inventory of Socio-Cultural Facilities, Special Tabulation, 1974.

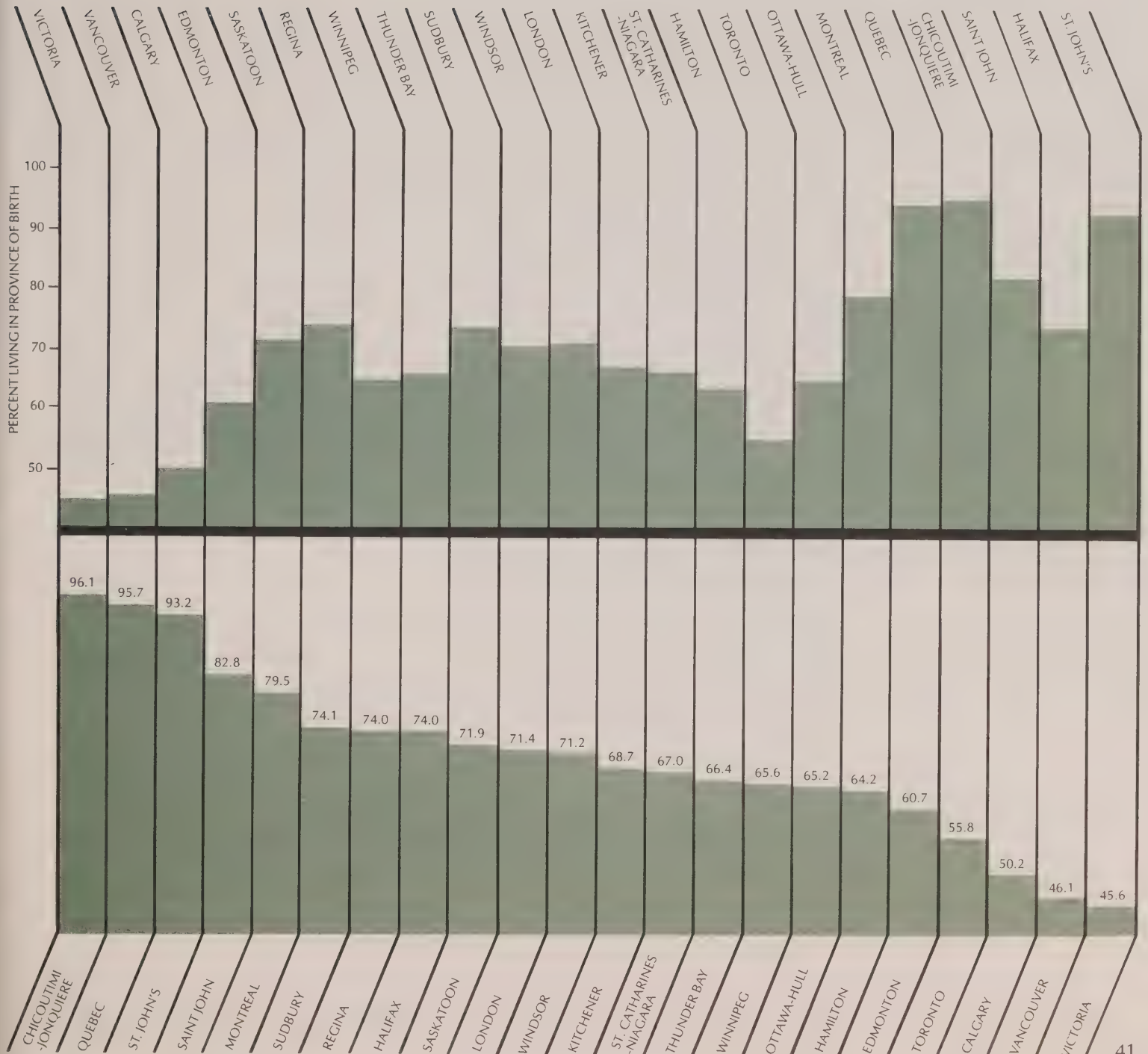
SOCIAL OPPORTUNITIES: AMOUNT OF FLOOR SPACE IN COMMERCIAL MEETING ESTABLISHMENTS PER 100 POPULATION (1972)



10. CULTURAL HOMOGENEITY

ASPECT MEASURED	The indicator reflects the degree of cultural homogeneity within a city. Thus it measures the extent to which residents share a common heritage.
CONSIDERATION OF THE MEASURE	1. AREA COVERAGE The data come directly from census figures which are broken down by specific country or province of birth. Data can be disaggregated for males and females, and are available at the levels of census tracts, census agglomerations, municipalities, census divisions and provinces, as well as the CMAs presented here. 2. TEMPORAL COVERAGE Data are available for census years only. 3. OTHER COVERAGE INCOMPATIBILITIES None are immediately apparent. 4. COLLECTION The data are available from Statistics Canada, 1971 Census of Canada, Catalogue 92-727, 1974. The information was collected on a 33⅓% sample basis. 5. COMPUTATION The computation is a straightforward percentaging of raw figures contained in the census.
OTHER MEASURES	Place of birth is only one way of defining cultural homogeneity. More sophisticated measures could be employed but these would have to be developed through survey research.

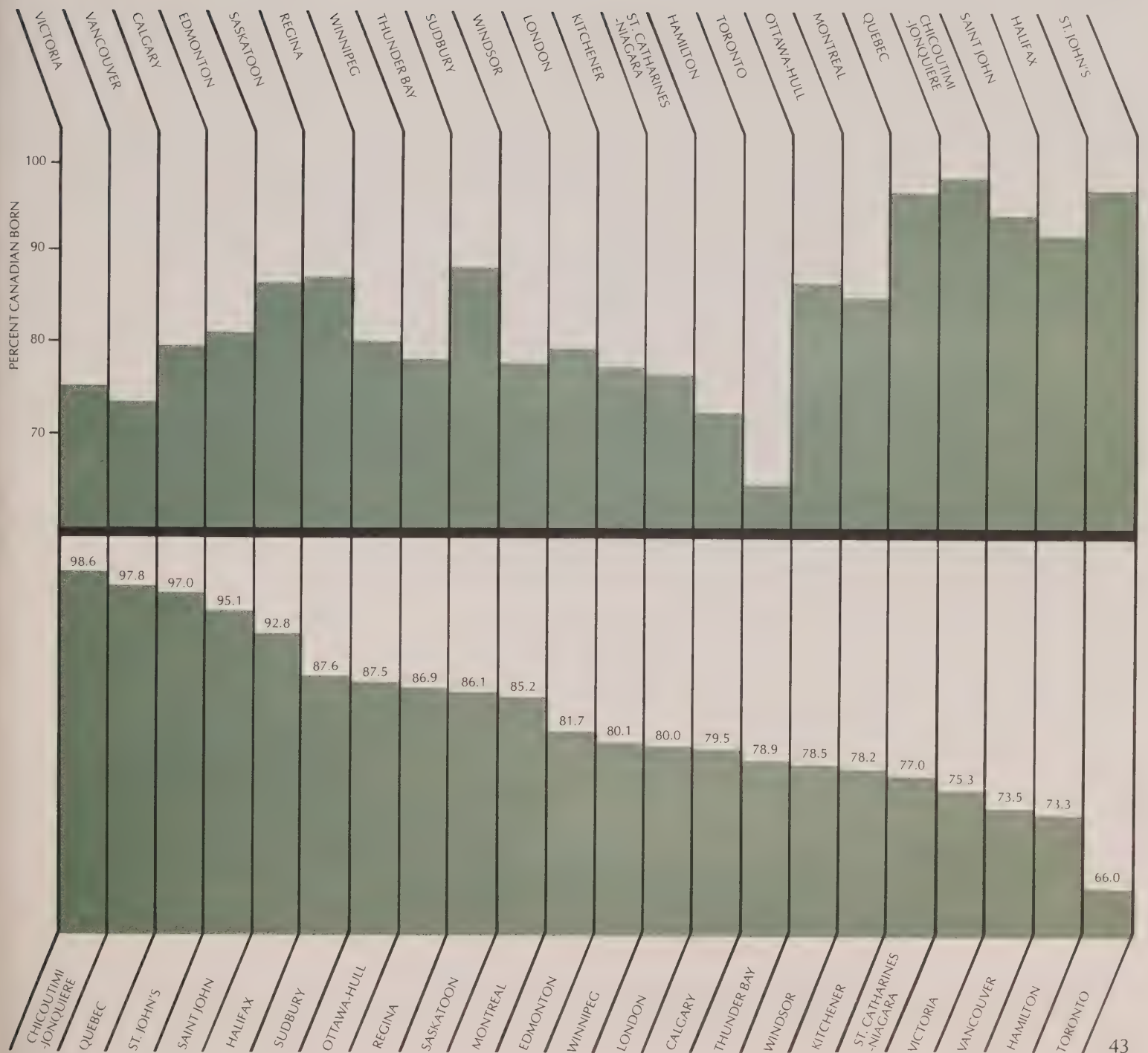
SOURCE:
Statistics Canada, 1971 Census of Canada, Catalogue 92-727, 1974.


PERCENT LIVING IN PROVINCE OF BIRTH
100
90
80
70
60
50
VICTORIA
VANCOUVER
CALGARY
EDMONTON
SASKATOON
REGINA
WINNIPEG
THUNDER BAY
SUDBURY
WINDSOR
LONDON
KITCHENER
ST. CATHARINES -NIAGARA
HAMILTON
TORONTO
OTTAWA-HULL
MONTREAL
QUEBEC
CHICOUTIMI -JONQUIERE
SAINT JOHN
HALIFAX
ST. JOHN'S
96.1
95.7
93.2
82.8
79.5
74.1
74.0
74.0
71.9
71.4
71.2
68.7
67.0
66.4
65.6
65.2
64.2
60.7
55.8
50.2
46.1
45.6
CHICOUTIMI -JONQUIERE
QUEBEC
ST. JOHN'S
SAINT JOHN
MONTREAL
SUDBURY
REGINA
HALIFAX
SASKATOON
LONDON
WINDSOR
KITCHENER
ST. CATHARINES -NIAGARA
THUNDER BAY
WINNIPEG
OTTAWA-HULL
HAMILTON
EDMONTON
TORONTO
CALGARY
VANCOUVER
VICTORIA

11. ETHNIC ORIGIN

ASPECT MEASURED	Ethnic origin, as measured by place of birth, shows the number of Canadian born living in each city. It is the non-Canadian born who usually reflect most strongly their original culture and who will still be making the greatest adjustment to Canadian society.
CONSIDERATION OF THE MEASURE	1. AREA COVERAGE The data come directly from census figures which are broken down by specific country or province of birth. Data can be disaggregated for males and females, and are available at the levels of census tracts, census agglomerations, municipalities, census divisions, and provinces, as well as the CMAs presented here. 2. TEMPORAL COVERAGE Data are available for census years only. 3. OTHER COVERAGE INCOMPATIBILITIES None are immediately apparent. 4. COLLECTION The data are available from Statistics Canada, 1971 Census of Canada, Catalogue 92-727, 1974. The information was collected on a 33⅓% sample basis. 5. COMPUTATION The computation is a straightforward percentaging of raw figures contained in the census.
OTHER MEASURES	Place of birth is perhaps the most stringent way of identifying ethnic groups. "Language spoken at home," also in the census, will include all immigrants who still reflect, in their language at least, their ethnic background. Ethnicity, as defined on the basis of "country of origin of ancestors," (census) is the loosest way of defining ethnic origin, since it includes people whose families have been in Canada for several generations.

SOURCE:
Statistics Canada, 1971 Census of Canada, Catalogue 92-727, 1974.

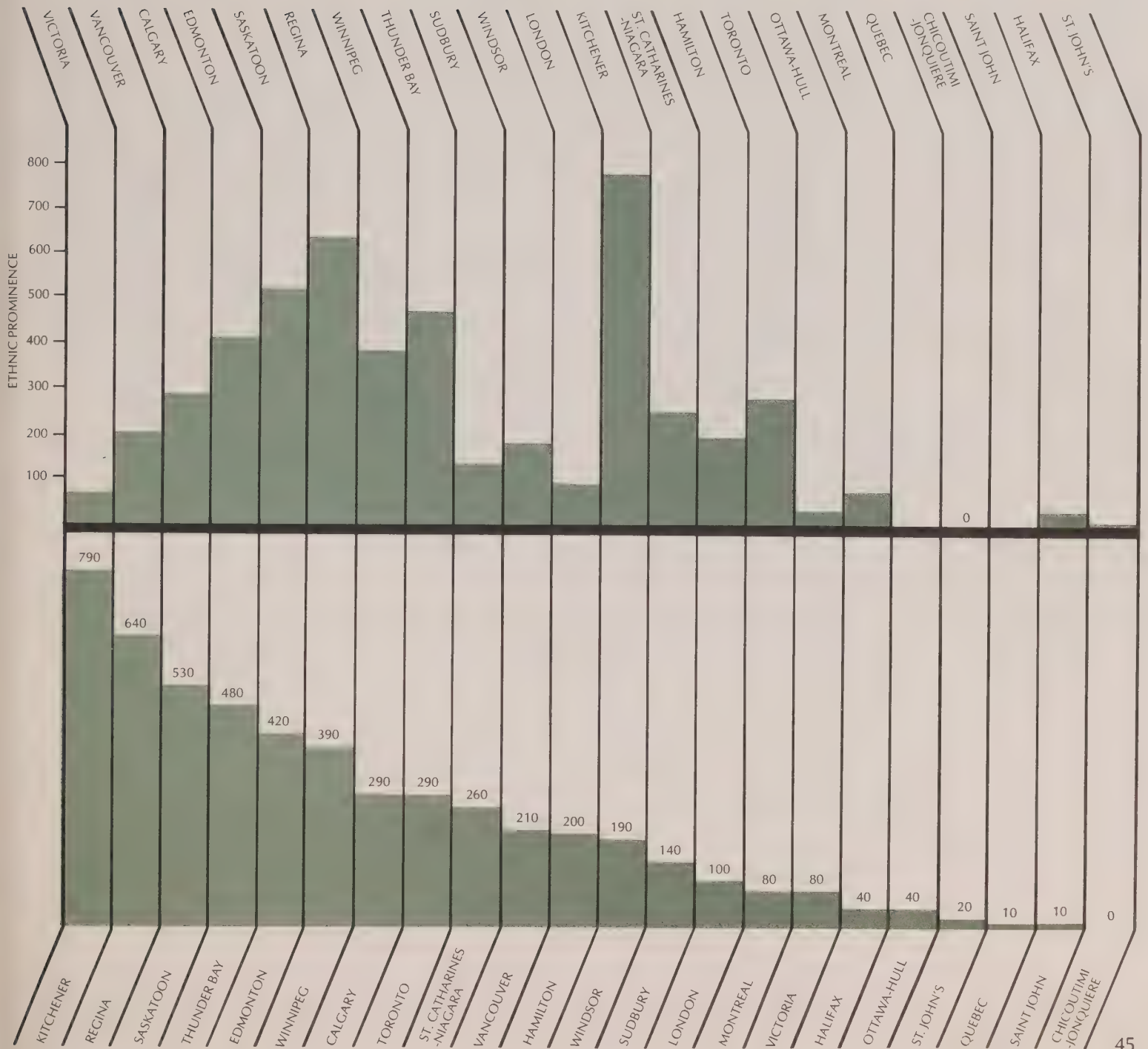

PERCENT CANADIAN BORN
100
90
80
70
VICTORIA
VANCOUVER
CALGARY
EDMONTON
SASKATOON
REGINA
WINNIPEG
THUNDER BAY
SUDBURY
WINDSOR
LONDON
KITCHENER
ST. CATHARINES -NIAGARA
HAMILTON
TORONTO
OTTAWA-HULL
MONTREAL
QUEBEC
CHICOUTIMI -JONQUIERE
SAINT JOHN
HALIFAX
ST. JOHN'S
98.6
97.8
97.0
95.1
92.8
87.6
87.5
86.9
86.1
85.2
81.7
80.1
80.0
79.5
78.9
78.5
78.2
77.0
75.3
73.5
73.3
66.0
CHICOUTIMI -JONQUIERE
QUEBEC
ST. JOHN'S
SAINT JOHN
HALIFAX
SUDBURY
OTTAWA-HULL
REGINA
SASKATOON
MONTREAL
EDMONTON
WINNIPEG
LONDON
CALGARY
THUNDER BAY
WINDSOR
KITCHENER
ST. CATHARINES -NIAGARA
VICTORIA
VANCOUVER
HAMILTON
TORONTO

12. ETHNIC PROMINENCE

ASPECT MEASURED	The index measures the degree to which a significant proportion of the population of a city is made up of persons of non-English or non-French origin. It reflects the extent to which cultural heterogeneity exists in a city.[1]	
CONSIDERATION OF THE MEASURE	1. AREA COVERAGE Data exist for all 22 CMAs as well as provinces, census divisions, cities or towns, other municipal subdivisions, census agglomerations and census tracts. They can be broken down for males and females. 2. TEMPORAL COVERAGE Data are available for census years only. 3. OTHER COVERAGE INCOMPATIBILITIES "Ethnic group" is determined by response to the question "To what ethnic or cultural group did you or your ancestor (on the male side) belong on coming to this continent?" This may have been several generations in the past, so the extent to which people who are recorded here as members of an ethnic group consider themselves members of that group may vary. 4. COLLECTION The data from which the computation was made are available from Statistics Canada, 1971 Census of Canada, Catalogue 92-723, 1973.	5. COMPUTATION The index is defined as Σp_i^2 when p_i is the percentage of the population represented by the i^{th} ethnic group. Because the percentage is squared, a few large ethnic groups will result in a higher index than many smaller groups. The index consequently emphasizes ethnic prominence rather than variety.
OTHER MEASURES	Definitions of ethnicity can also be based on language spoken at home or birthplace, and will include only the more recent immigrants.	

[1] In other words, it measures the extent to which non-English and non-French ethnic groups represent significant proportions of the CMA population. Theoretically the index can range from 0 to 10,000 although here the range is from 0 to 790

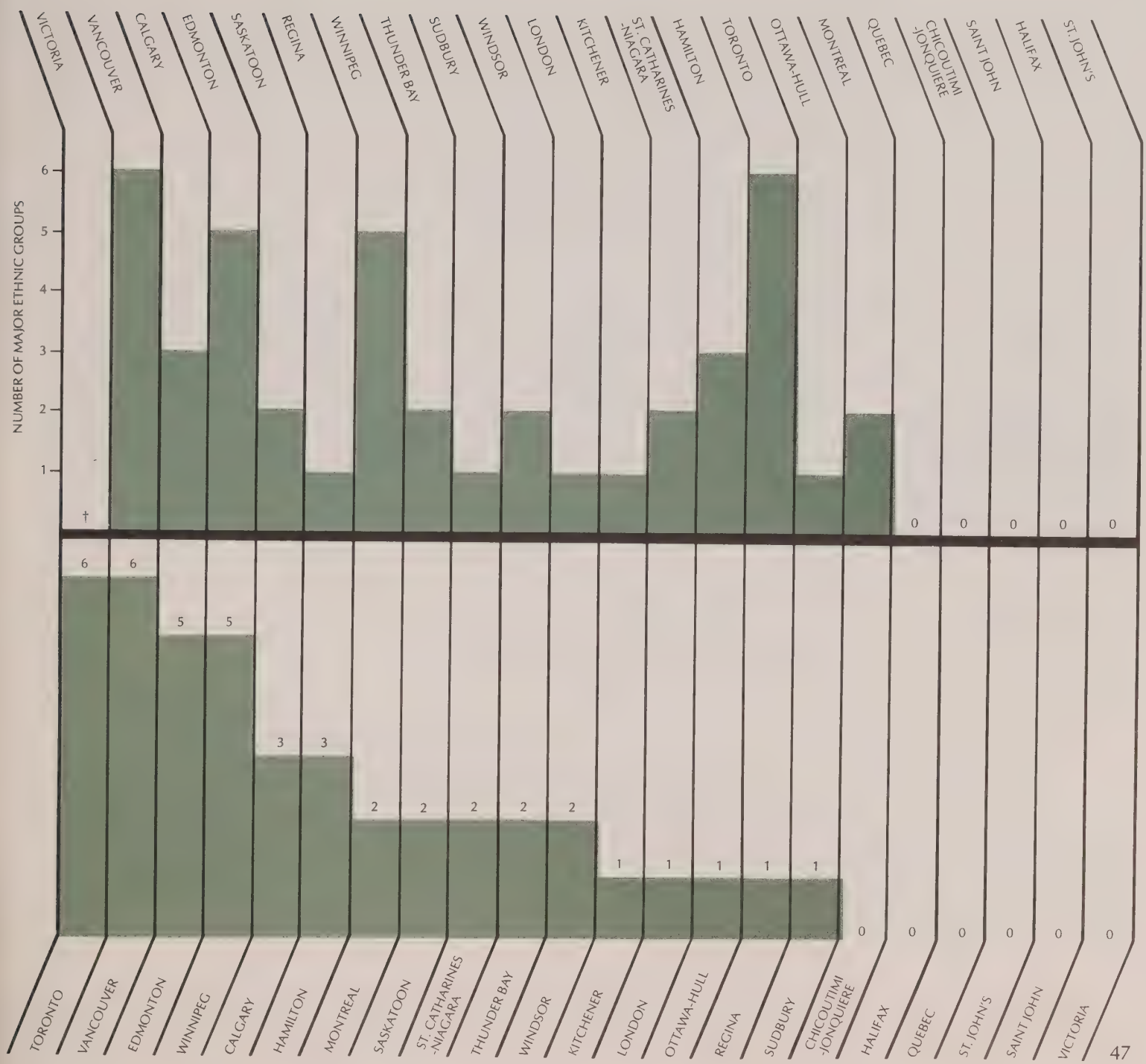
SOURCE:
Statistics Canada, 1971 Census of Canada, Catalogue 92-723, 1973.


ETHNIC PROMINENCE
800
700
600
500
400
300
200
100
VICTORIA
VANCOUVER
CALGARY
EDMONTON
SASKATOON
REGINA
WINNIPEG
THUNDER BAY
SUDBURY
WINDSOR
LONDON
KITCHENER
ST. CATHARINES -NIAGARA
HAMILTON
TORONTO
OTTAWA-HULL
MONTREAL
QUEBEC
CHICOUTIMI -JONQUIERE
SAINT JOHN
HALIFAX
ST. JOHN'S
0
790
640
530
480
420
390
290
290
260
210
200
190
140
100
80
80
40
40
20
10
10
0
KITCHENER
REGINA
SASKATOON
THUNDER BAY
EDMONTON
WINNIPEG
CALGARY
TORONTO
ST. CATHARINES -NIAGARA
VANCOUVER
HAMILTON
WINDSOR
SUDBURY
LONDON
MONTREAL
VICTORIA
HALIFAX
OTTAWA-HULL
ST. JOHN'S
QUEBEC
SAINT JOHN
CHICOUTIMI -JONQUIERE

13. MAJOR ETHNIC GROUPS

ASPECT MEASURED	The index reflects the extent to which cultural heterogeneity exists in a city and gives an indication of how many ethnic groups have a significantly large membership.
CONSIDERATION OF THE MEASURE	1. AREA COVERAGE Data exist for all 22 CMAs as well as provinces, census divisions, cities or towns, other municipal subdivisions, census agglomerations and census tracts. They can be broken down for males and females. 2. TEMPORAL COVERAGE Data are available for census years only. 3. OTHER COVERAGE INCOMPATIBILITIES "Ethnic group" is determined by response to the question "To what ethnic or cultural group did you or your ancestor (on the male side) belong on coming to this continent?" This may have been several generations in the past, so the extent to which people recorded here as being members of an ethnic group consider themselves members of that group may vary. 4. COLLECTION The data from which the computation was made are available from Statistics Canada, 1971 Census of Canada, Catalogue 92-723, 1973. 5. COMPUTATION A "major ethnic group" is one which comprises a significant proportion of the population. For these purposes, a "significant proportion" varies between 2% of the population of the largest cities and 10% of the population of the smallest, along a sliding scale. This sliding scale reflects differences between cities in the absolute number of any one group which would result in that group's having a recognizable impact on the community. Thus an ethnic group comprising 2% of the population of Toronto (over 50,000 people in 1971) would, in our estimation, have a significant impact on the cultural life of that city. On the other hand, in Thunder Bay, it may require 10,000 people of the same ethnic background (approximately 10% of the population) before a comparable impact is felt. The sliding scale attempts to reflect this.
OTHER MEASURES	Definitions of ethnicity can also be based on language spoken at home or birthplace, and will include only the more recent immigrants.

SOURCE:
Statistics Canada, 1971 Census of Canada, Catalogue 92-723, 1973.

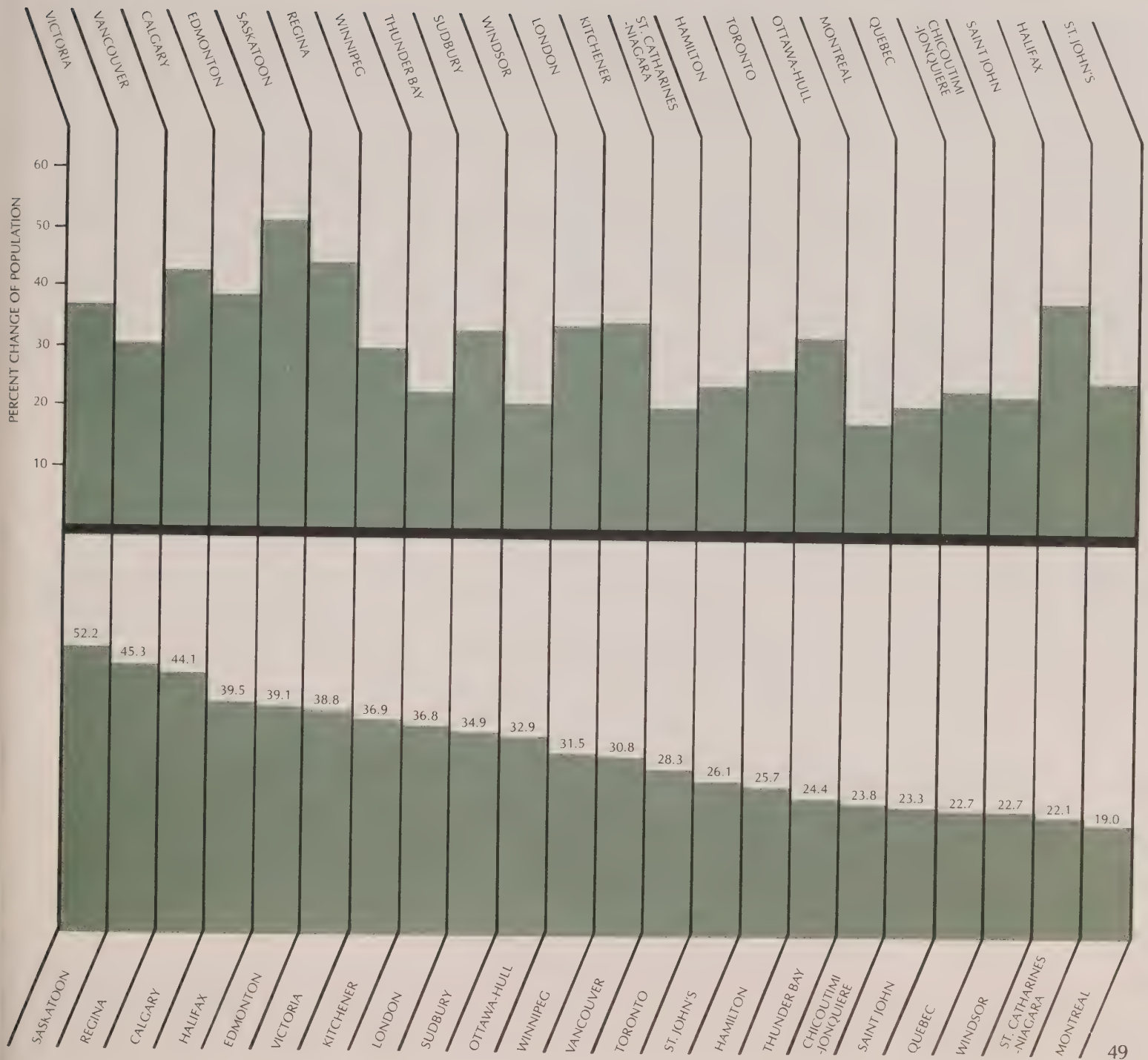

NUMBER OF MAJOR ETHNIC GROUPS
1
2
3
4
5
6
†
0
VICTORIA
VANCOUVER
CALGARY
EDMONTON
SASKATOON
REGINA
WINNIPEG
THUNDER BAY
SUDBURY
WINDSOR
LONDON
KITCHENER
ST. CATHARINES -NIAGARA
HAMILTON
TORONTO
OTTAWA-HULL
MONTREAL
QUEBEC
CHICOUTIMI -JONQUIERE
SAINT JOHN
HALIFAX
ST. JOHN'S
6
6
5
5
3
3
2
2
2
2
2
1
1
1
1
1
0
0
0
0
0
0
TORONTO
VANCOUVER
EDMONTON
WINNIPEG
CALGARY
HAMILTON
MONTREAL
SASKATOON
ST. CATHARINES -NIAGARA
THUNDER BAY
WINDSOR
KITCHENER
LONDON
OTTAWA-HULL
REGINA
SUDBURY
CHICOUTIMI -JONQUIERE
HALIFAX
QUEBEC
ST. JOHN'S
SAINT JOHN
VICTORIA

14. POPULATION TURNOVER

ASPECT MEASURED	The gross migration ratio is a measure of the extent to which there is a flow of migrants to and from each CMA. It reflects the extent to which social relationships are made and broken as a result of moving, and says something about overall population stability in a city. It is possible, for example, that a city whose total population has remained stable over a five-year period has experienced a greater level of population turnover than one which has grown substantially in total population. Lack of growth is not therefore synonymous with stability of social relationships.
CONSIDERATION OF THE MEASURE	1. AREA COVERAGE The data are published by Statistics Canada at the CMA level only. 2. TEMPORAL COVERAGE Migration data are collected for census years only. 3. OTHER COVERAGE INCOMPATIBILITIES It is possible that the same people may have moved in and out of the CMA several times over the five-year period. 4. COLLECTION The data are available from Statistics Canada, 1971, Census of Canada, Catalogue 92-746, 1974. 5. COMPUTATION The ratio is computed as follows: $\frac{\text{in-migrants + out-migrants, 1966–71} \times 100}{\text{Total population, 1971}}$
OTHER MEASURES	None are immediately evident. Although survey sampling could provide estimates of the impact of mobility on social relationships, the costs and efforts involved may not be justified by the value of the findings for policy purposes.

SOURCE:
Statistics Canada, 1971 Census of Canada, Catalogue 92-746, 1974.

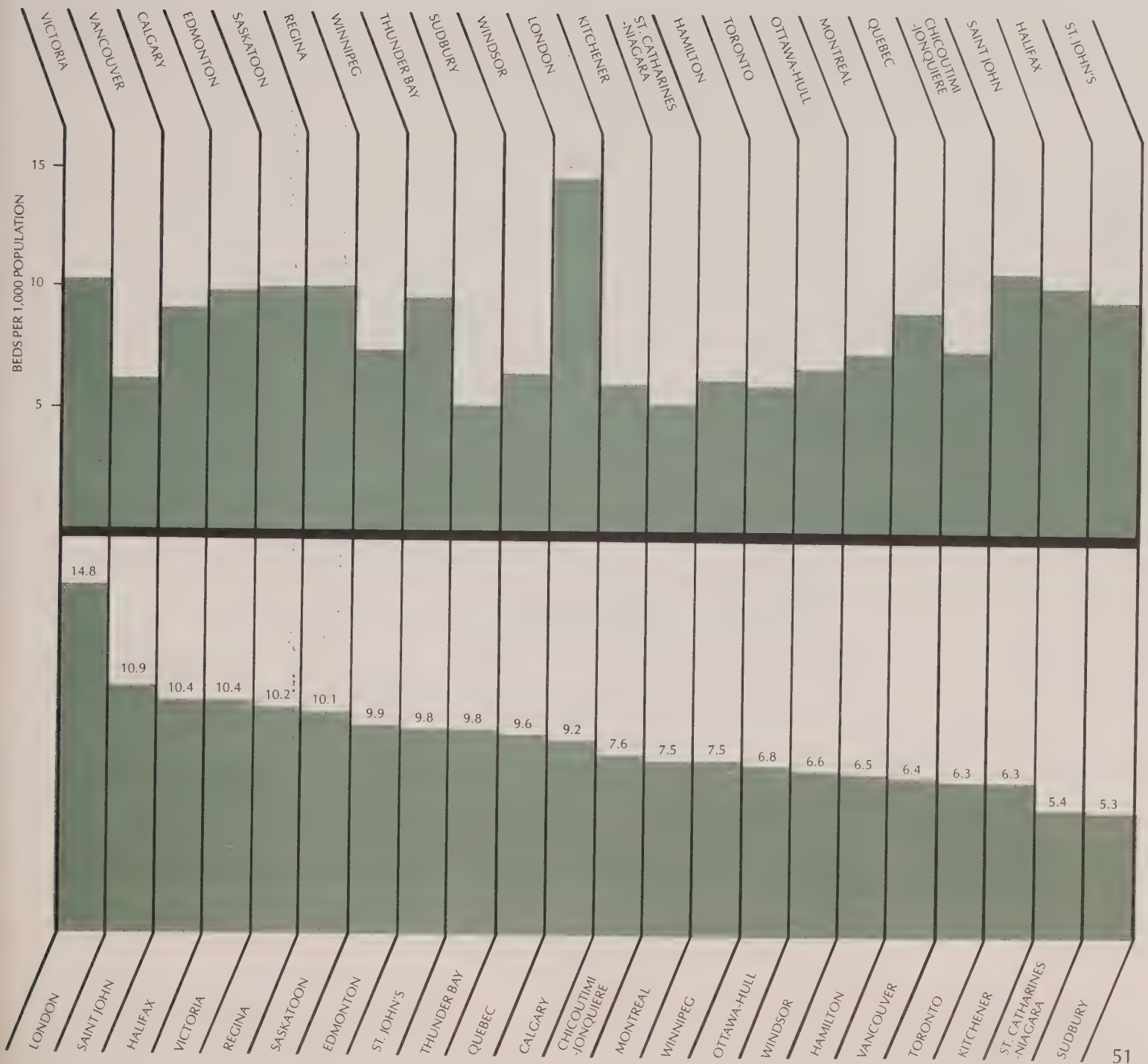
POPULATION TURNOVER: RATIO OF IN-MIGRANTS AND OUT-MIGRANTS TO THE TOTAL POPULATION (1966 TO 1971)



15. HOSPITAL BEDS

ASPECT MEASURED	The number of hospital beds set up is an overall measure of the availability of hospital care to the population of each CMA. Facilities in general and allied special hospitals which provide basic care (pediatric, rehabilitation, extended care and others) are reported. The ratio of beds to population should indicate the ease of obtaining a bed in a hospital.	
CONSIDERATION OF THE MEASURE	1. AREA COVERAGE Data are compiled at the CMA level by Statistics Canada. Listings for individual hospitals across the country are also available. 2. TEMPORAL COVERAGE A list of Canadian hospitals is published annually. Subsequently, CMA data are compiled but not published. 3. OTHER COVERAGE INCOMPATIBILITIES While all hospitals included in the measure are general or allied special hospitals, varying portions of such hospitals may be devoted to special facilities, such as psychiatric or tuberculosis units, rather than to general care facilities. While hospitals generally serve the metropolitan areas in which they are located, "catchment areas" may be considerably larger for hospitals providing services for surrounding rural areas.	4. COLLECTION Data are compiled by Statistics Canada on the basis of reports by individual hospitals, with the cooperation of provincial hospital and welfare authorities. A list of hospitals and facilities is published annually in Catalogue 83-201 and unpublished compilations are made by the Hospital Section of the Health Division of Statistics Canada. 5. COMPUTATION Data are taken directly from Statistics Canada figures.
OTHER MEASURES	A better measure than hospital beds of the availability of facilities would be the average waiting period for elective or non-emergency surgery. To our knowledge, comparable data for this do not exist. Data on hospital expenditures and detailed specifications of facilities and personnel are available, and similar information is collected for mental institutions, but these data suffer from the same drawbacks as data on the number of hospital beds. All are input measures which may not equate directly with the health of individuals, the ultimate output measure. Specific measures of the level of individual health, while highly desirable, either do not exist at all or show few differences between cities.	Mortality rates are often considered a broad surrogate for health level and these are available. However, only minor variations in mortality rates are observable between metropolitan areas. Nutrition data were also considered, but the sample sizes were inadequate for drawing comparisons between metropolitan areas.

SOURCE:
Statistics Canada, Health Division, Hospital Section, Unpublished Data, 1973.


BEDS PER 1,000 POPULATION
15
10
5
VICTORIA
VANCOUVER
CALGARY
EDMONTON
SASKATOON
REGINA
WINNIPEG
THUNDER BAY
SUDBURY
WINDSOR
LONDON
KITCHENER
ST. CATHARINES -NIAGARA
HAMILTON
TORONTO
OTTAWA-HULL
MONTREAL
QUEBEC
CHICOUTIMI -JONQUIERE
SAINT JOHN
HALIFAX
ST. JOHN'S
14.8
10.9
10.4
10.4
10.2
10.1
9.9
9.8
9.8
9.6
9.2
7.6
7.5
7.5
6.8
6.6
6.5
6.4
6.3
6.3
5.4
5.3
LONDON
SAINT JOHN
HALIFAX
VICTORIA
REGINA
SASKATOON
EDMONTON
ST. JOHN'S
THUNDER BAY
QUEBEC
CALGARY
CHICOUTIMI -JONQUIERE
MONTREAL
WINNIPEG
OTTAWA-HULL
WINDSOR
HAMILTON
VANCOUVER
TORONTO
KITCHENER
ST. CATHARINES -NIAGARA
SUDBURY

16. VOTER TURNOUT

ASPECT MEASURED

Voter turnout is one measure of the state of civic participation. The exercising of franchise represents the level of interest that citizens have in the government of their community, their perceived ability to determine the philosophy of government and their perceived opportunity to influence public policy and process.

Although it is a gross measure of participation, voter turnout does reflect the electorate's overall opinions of the momentousness of decisions and its power to affect these decisions. It is interesting to note that, on the average, federal and provincial elections produce about twice the voter turnout as municipal elections.

CONSIDERATION OF THE MEASURE

1. AREA COVERAGE

The area coverage includes the central cities of CMAs. Thus, the coverage of population varies from a relatively small proportion of the CMA (i.e., Toronto), to the total CMA (i.e., Calgary).

2. TEMPORAL COVERAGE

The coverage reveals the average turnout at municipal elections since 1969 which includes the years 1969 to 1974. For 8 cities there have been two elections and for 14 cities three elections. Date of elections varies, as does the length of term in office.

3. OTHER COVERAGE INCOMPATIBILITIES

In the past, elections in a few cities were alternatively for the mayor and part of the council and for the remaining councillors. Accordingly, interest in elections reflects typical perceptions of the importance of the offices at stake. This has become less of a problem recently because of the trend away from overlapping terms of office.

Another problem is that some cities include expenditure referenda along with the general election for office. A higher turnout would be expected where this is the case, other things being equal. Variation in the criteria of voter eligibility may also affect turnout rates; for example, where tenants are underrepresented on the rolls, turnout rates may be higher since property owners are more likely to exercise their franchise.

4. COLLECTION

The prime source of data is a survey by the Institute for Local Government, Queen's University. These data were updated in most instances and newly gathered in a few cases by telephone contact with city clerks' offices (or their equivalent) in the major cities of each CMA. The data used here could readily be updated by means of an expanded and more regular survey on the part of the Institute, or simply through telephone contact.

5. COMPUTATION

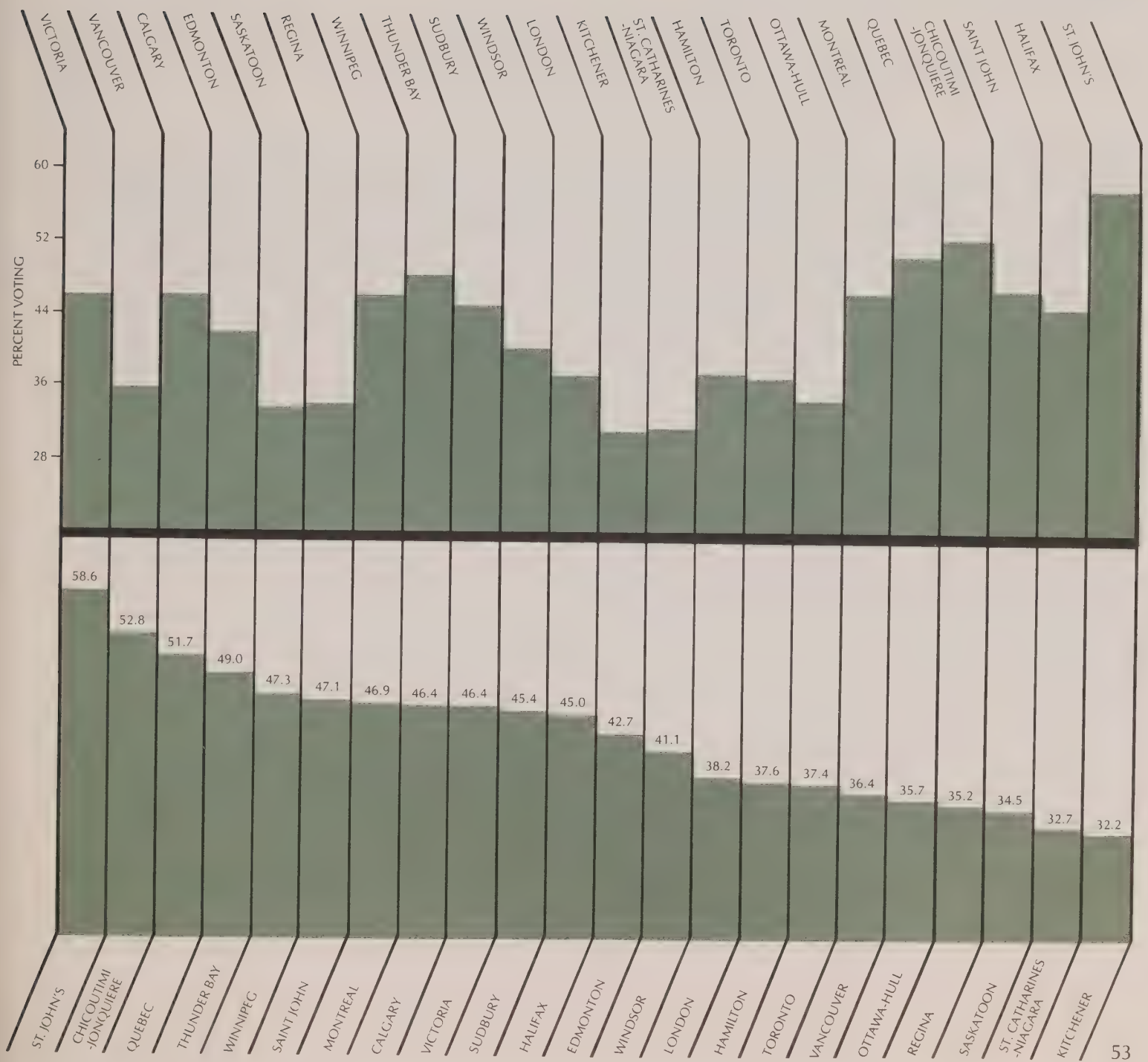
The percentage was computed by taking the total number of votes cast in the two or three elections since 1969 as a percentage of the total number of eligible voters in the same elections.

OTHER MEASURES

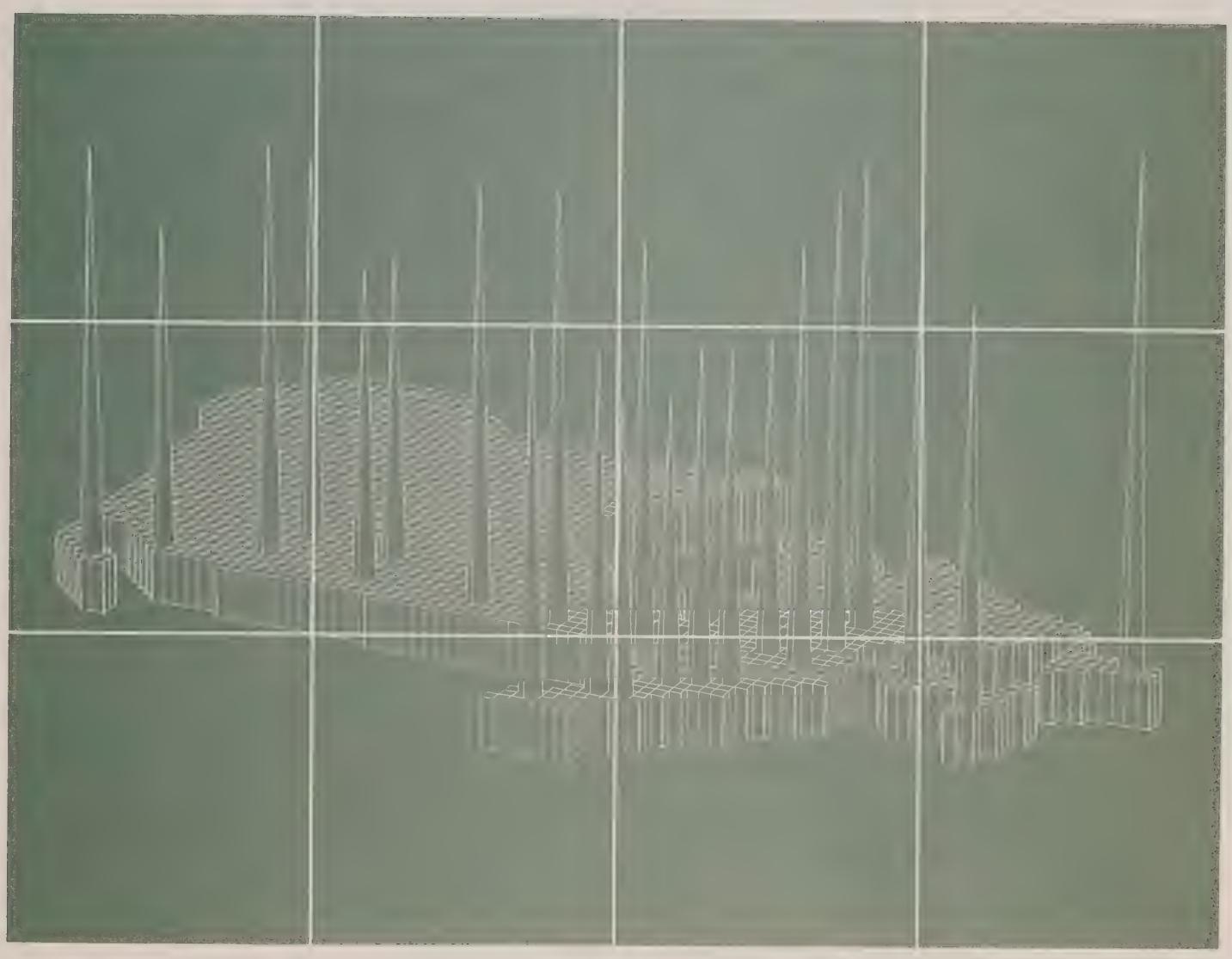
Voter turnout is not necessarily the best measure of citizen involvement in public affairs. Undoubtedly, one wishes for a broader concept, one that would weigh public participation at all levels of government. However, there is no consistent, comparable inter-urban data, although one expects that students of politics would have long ago sought such information. Nor does it seem that any consensus exists on what constitutes a good measure of involvement.

Off the cuff, it seems that several measures could be used to calculate the intensity of involvement: metropolitan membership of federal parties; metropolitan membership of provincial parties; membership of community organizations; role of legitimate community organizations in the community as represented by the number and range of issues raised and dealt with. These do not exhaust the list but only suggest some way of obtaining a more basic measure of participation.

SOURCE:
Unpublished survey data from the Institute for Local Government, Queen's University, Kingston and telephone calls to city clerks' offices.


PERCENT VOTING
60
52
44
36
28
VICTORIA
VANCOUVER
CALGARY
EDMONTON
SASKATOON
REGINA
WINNIPEG
THUNDER BAY
SUDBURY
WINDSOR
LONDON
KITCHENER
ST. CATHARINES -NIAGARA
HAMILTON
TORONTO
OTTAWA-HULL
MONTREAL
QUEBEC
CHICOUTIMI -JONQUIÈRE
SAINT JOHN
HALIFAX
ST. JOHN'S
58.6
52.8
51.7
49.0
47.3
47.1
46.9
46.4
46.4
45.4
45.0
42.7
41.1
38.2
37.6
37.4
36.4
35.7
35.2
34.5
32.7
32.2
ST. JOHN'S
CHICOUTIMI -JONQUIÈRE
QUEBEC
THUNDER BAY
WINNIPEG
SAINT JOHN
MONTREAL
CALGARY
VICTORIA
SUDBURY
HALIFAX
EDMONTON
WINDSOR
LONDON
HAMILTON
TORONTO
VANCOUVER
OTTAWA-HULL
REGINA
SASKATOON
ST. CATHARINES -NIAGARA
KITCHENER

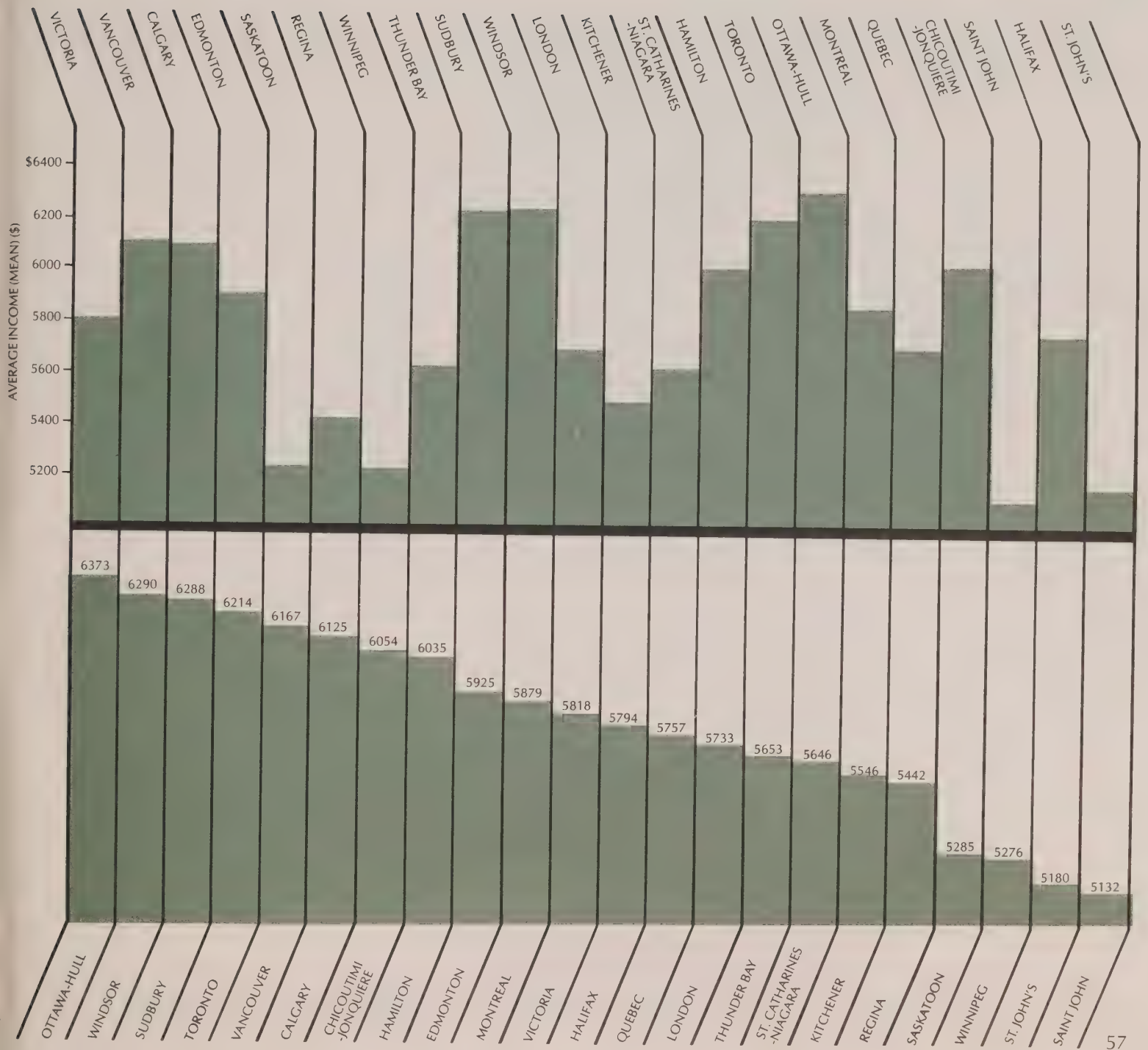
ECONOMIC DEVELOPMENT



17. AVERAGE INCOME (MEAN)

ASPECT MEASURED	Average income after federal taxes is a measure of economic well-being. Adjusting for taxes gives a better measure of command over private goods and services, because of variations in marginal rates of taxation.	
CONSIDERATION OF THE MEASURE	1. AREA COVERAGE National revenue data are not necessarily reported on a CMA basis. We do not now know what the spatial bias is. Individuals living outside a metropolitan area could file their tax returns from an accountant's office in the metropolitan area or vice versa. 2. TEMPORAL COVERAGE The data are reported on an annual basis, and are published within two years of the end of the tax year. 3. OTHER COVERAGE INCOMPATIBILITIES Regional variations in the number of non-filers may cause a problem. It is possible that in some metropolitan areas the figures should be adjusted downward to reflect higher non-filer rates. Moreover, in certain metropolitan areas salary or wage income contributes a higher proportion to the overall income, and it is well known that this income is typically fully reported.	In these cases a downward adjustment would seem in order. 4. COLLECTION The data are available from the National Revenue *Taxation Statistics*, 1974 edition (Annual). 5. COMPUTATION Total federal tax payable for a major metropolitan area is subtracted from total income assessed and divided by the total number of tax filers to give the arithmetic mean of income. In every province, with the exception of Quebec, the federal tax payable includes income taxes collected by the federal government for its own purposes and on behalf of the provinces. Quebec collects its own provincial income taxes, and they are not recorded in the National Revenue *Taxation Statistics*. Accordingly, the taxation statistics have been adjusted upwards to account for the income taxes which Quebec collects directly.
OTHER MEASURES	"Average after-tax income" is neither the most complete nor the best measure of disposable income and is only a rough indicator of overall economic well-being. A more appropriate measure would be that of median income. In turn, this figure should be adjusted for taxes to all levels of government. A further adjustment should then be made for cost of living differentials. In this way, one would have an appropriate comparative-income figure. Considering the available data, we are a long way from computing such a figure. The greatest problem is a lack of comparative price data, excepting certain segments of the housing market. In view of the fact that Statistics Canada does provide a comparative cost-of-living index for foreign capitals where Canadian embassies are located and for small northern communities in Canada, the unavailability of an index for other urban places is particularly vexing. (The sample of 14 Canadian cities that does exist does not provide the geographical detail required for most analytical purposes and excludes the housing component.) On the tax side, the problems seem less difficult although data on provincial taxes would have to be adjusted to reflect variations in what the taxes pay for (e.g., in some cases additional payments are made for hospital insurance). The same could be the case for municipalities (i.e. water taxes, additional services charges). Even with this information we cannot account for variations in the quality of services.	

SOURCE:
Revenue Canada, *Taxation Statistics: Analyzing the Returns of Individuals for the 1972 Taxation Year*, 1974 edition.


AVERAGE INCOME (MEAN) ($)
$6400
6200
6000
5800
5600
5400
5200
VICTORIA
VANCOUVER
CALGARY
EDMONTON
SASKATOON
REGINA
WINNIPEG
THUNDER BAY
SUDBURY
WINDSOR
LONDON
KITCHENER
ST. CATHARINES -NIAGARA
HAMILTON
TORONTO
OTTAWA-HULL
MONTREAL
QUEBEC
CHICOUTIMI -JONQUIERE
SAINT JOHN
HALIFAX
ST. JOHN'S
6373
6290
6288
6214
6167
6125
6054
6035
5925
5879
5818
5794
5757
5733
5653
5646
5546
5442
5285
5276
5180
5132
OTTAWA-HULL
WINDSOR
SUDBURY
TORONTO
VANCOUVER
CALGARY
CHICOUTIMI -JONQUIERE
HAMILTON
EDMONTON
MONTREAL
VICTORIA
HALIFAX
QUEBEC
LONDON
THUNDER BAY
ST. CATHARINES -NIAGARA
KITCHENER
REGINA
SASKATOON
WINNIPEG
ST. JOHN'S
SAINT JOHN

18. AVERAGE INCOME (ADJUSTED)

ASPECT MEASURED

Income adjusted for taxes and housing costs provides a measure of the dollar value of discretionary income earned in each major urban area. Housing costs make up a major proportion of household expenditures (25% to 30%). It is inevitable that the proportion of the family budget set aside for housing varies according to average housing costs in each city. The adjustment to total income reflects this. Federal income tax also takes away a significant portion of gross income, and this varies according to tax bracket. The subtraction of income tax for this indicator reflects this.

CONSIDERATION OF THE MEASURE

1. AREA COVERAGE

Revenue Canada data are not reported on a CMA basis. Data on housing costs are available from CMHC for all 22 CMAs.

2. TEMPORAL COVERAGE

Income data are reported on an annual basis. Data on housing costs are reported annually and are available in May for the preceding year.

3. OTHER COVERAGE INCOMPATIBILITIES

Regional variation in the number of non-filers may cause a problem. Moreover, in certain metropolitan areas salary or wage income contributes a higher proportion to the overall income and it is well known that this income is typically fully reported.

The average cost of a single-detached National Housing Act (NHA) house does not necessarily represent the overall average cost of housing. Only low and moderate priced housing are eligible for NHA financing. Thus the average cost reported here is on the low side. Moreover, the quality and size of housing is not taken into account in reporting average cases. An attempt to partially control for this has been made by basing housing costs on the cost of a 1100-square-foot house on an average lot in each of the CMAs.

4. COLLECTION

Income data for the 1972 taxation year are available from the National Revenue *Taxation Statistics*, 1974 edition (Annual). It is assumed that the data are thus highly reliable. Housing costs are found in *Canadian Housing Statistics* 1972, CMHC, 1973 edition.

5. COMPUTATION

Total federal tax payable by all tax payers in a major metropolitan area is subtracted from total income assessed and divided by the total number of tax filers, to give the arithmetic mean of income. In every province with the exception of Quebec, the federal tax payable includes income taxes collected by the federal government for its own purposes and on behalf of the provinces. Quebec collects its own provincial income taxes, and they are not recorded in the National Revenue *Taxation Statistics*. Accordingly, the taxation statistics have been adjusted upwards to account for the income taxes which Quebec collects directly.

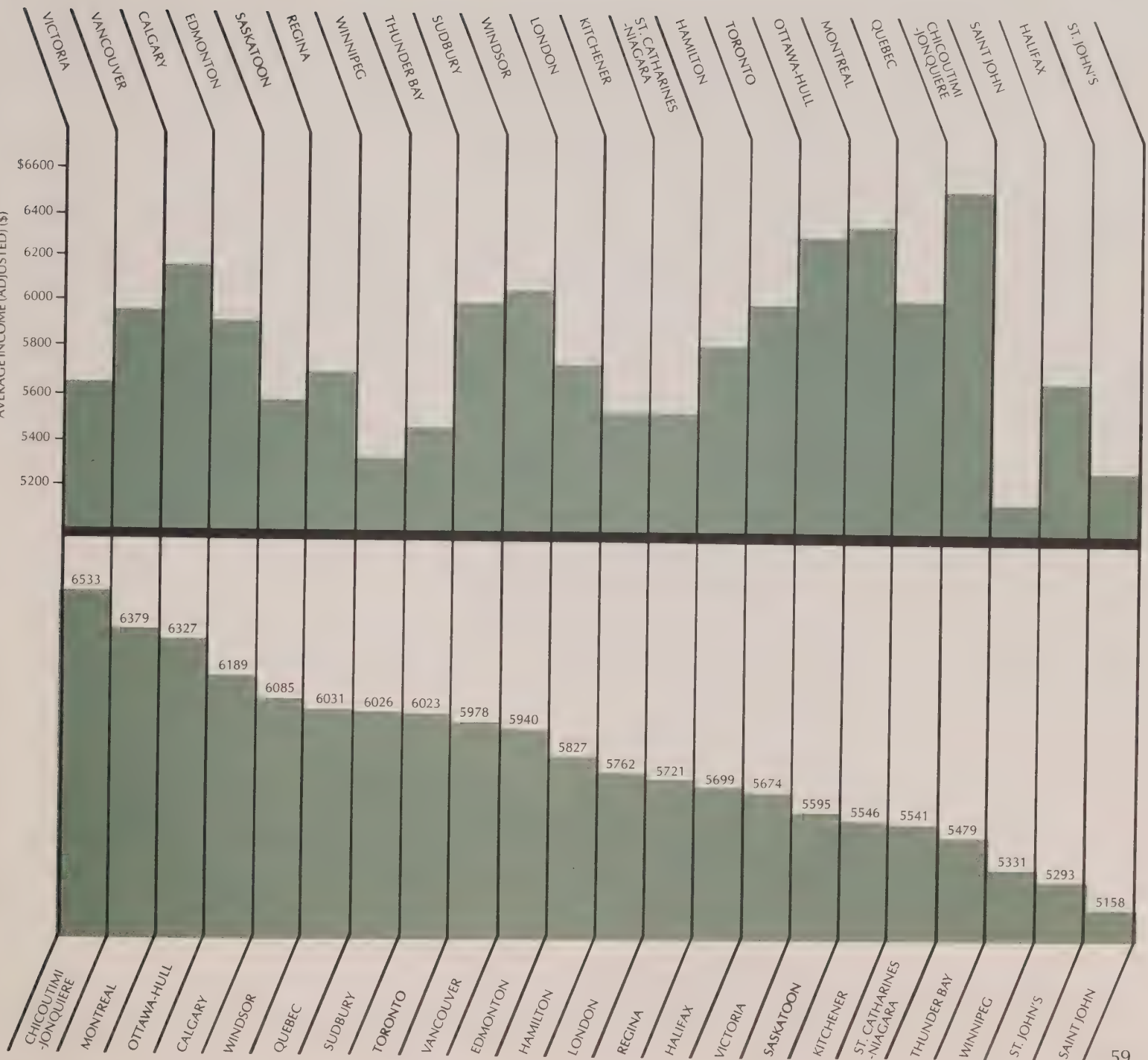
The after-tax income is then adjusted to reflect differential housing costs in each CMA. The differential housing cost is computed for each CMA by multiplying the proportion of income estimated as typically spent on housing (25 percent of pre-tax income) times the housing price index, for which the average housing cost for all CMAs equals 1.00. The difference between this value and the proportion of income typically spent on housing reflects the savings or additional costs which one faces in acquiring a house in a particular CMA. When the after-tax income is adjusted by the savings or additional costs, the average income then reflects more closely real discretionary income between the major urban areas.

OTHER MEASURES

A more adequate measure of comparative income would be the after-tax disposable income from all sources, which in turn would be adjusted for consumer price differences. Again the median would be a preferable measure of income and there should be some measure of the proportion of high and low income families.

SOURCE:
Revenue Canada, *Taxation Statistics For the 1972 Taxation Year*, 1974 edition, and CMHC, *Canadian Housing Statistics*, 1972, 1973 edition.

AVERAGE ADJUSTED INCOME OF TAX FILERS, AFTER FEDERAL TAX AND ADJUSTED FOR COMPARATIVE HOUSING COSTS (1972)

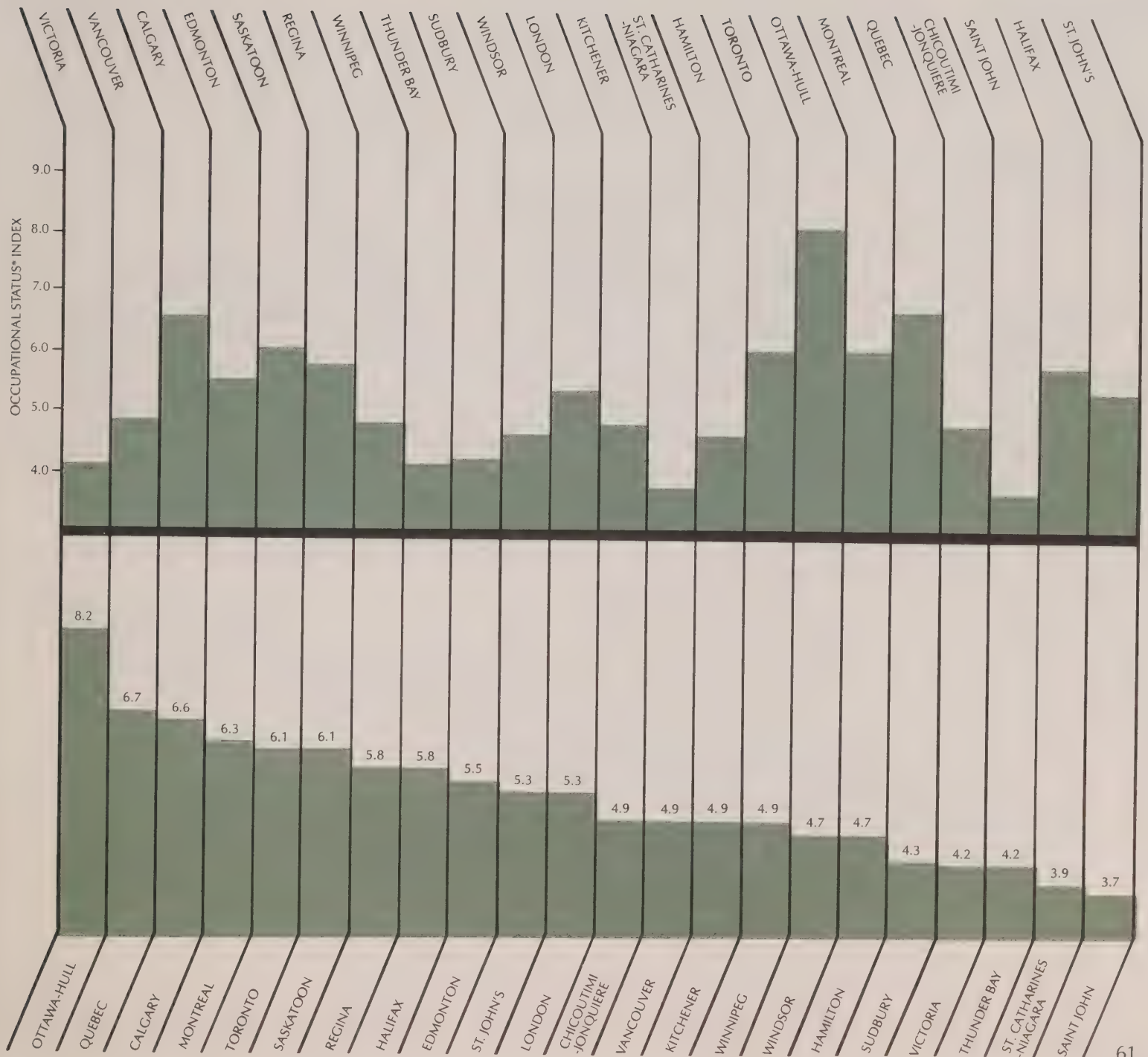


19. OCCUPATIONAL STATUS

ASPECT MEASURED	The occupational status of metropolitan areas might be seen as the drawing power of that labour market for highly skilled labour.[1] Thus it is a measure of labour market quality, and perhaps of overall dominance, on at least a broad regional level and in many instances at a national or combined national-regional level. In general, then, the measure provides an indicator of the attractiveness of a particular metropolitan area to migrants.	
CONSIDERATION OF THE MEASURE	1. AREA COVERAGE Occupational status was computed from 1971 census data. Comparisons can be had for areal sub-units such as inner city and suburbs or other sub-areas. 2. TEMPORAL COVERAGE While baseline data are available only at the time of census taking, Immigration Canada has developed a model for forecasting occupational growth for metropolitan areas. From this a yearly estimate would be possible. 3. OTHER COVERAGE INCOMPATIBILITIES None are immediately evident. 4. COLLECTION The data are available from Statistics Canada, 1971 Census of Canada, Catalogue 94–719, 1974. 5. COMPUTATION The computation of the occupational status measure involves several steps, yet is nonetheless straightforward. To begin with, a scale has been developed for assigning to an occupation a rank from one to ten, on the basis of the relative skills,	experience and training required for qualification in that occupation. The scale is based on a massive survey of all occupations in Canada. The rating scheme is provided in the Canadian Classification Dictionary of Occupations. Based on these ratings and the scale, a listing was derived of all occupation groups ranking 8, 9 or 10 (out of a possible ten points). For each metropolitan area the total number of persons with occupations in the top three categories was calculated. This figure was divided by the total number of individuals in the labour force. The occupational index, then, is the proportion of the total labour force in the three highest levels.
OTHER MEASURES	High occupational status of itself should not be construed as the sole factor in assessing the dynamism of an urban labour market. For those with less "impressive" skills, the availability of "blue collar" employment and opportunity for occupational mobility is much more critical. Nevertheless, the dominance of an area in the former respect should have spin-offs throughout the labour market. A more useful indicator would be an occupation index specifically designed to identify the potential for future growth in each occupation.	It would identify the growth potential of the key occupations and those which have the largest multiplier effect on growth in other occupations. This could be used in combination with an industry growth index. In addition to gross indices, finer breakdowns are required by sex and level of experience, whether new entrants or persons with required or related skills.

[1] Occupational status index is the percentage of the labour force in the three highest skilled occupational categories.
Illustrative of the occupational groups in these three categories are the following professions: lawyers, economists, university teachers, engineers, physical and natural scientists, business executives and physicians and surgeons.

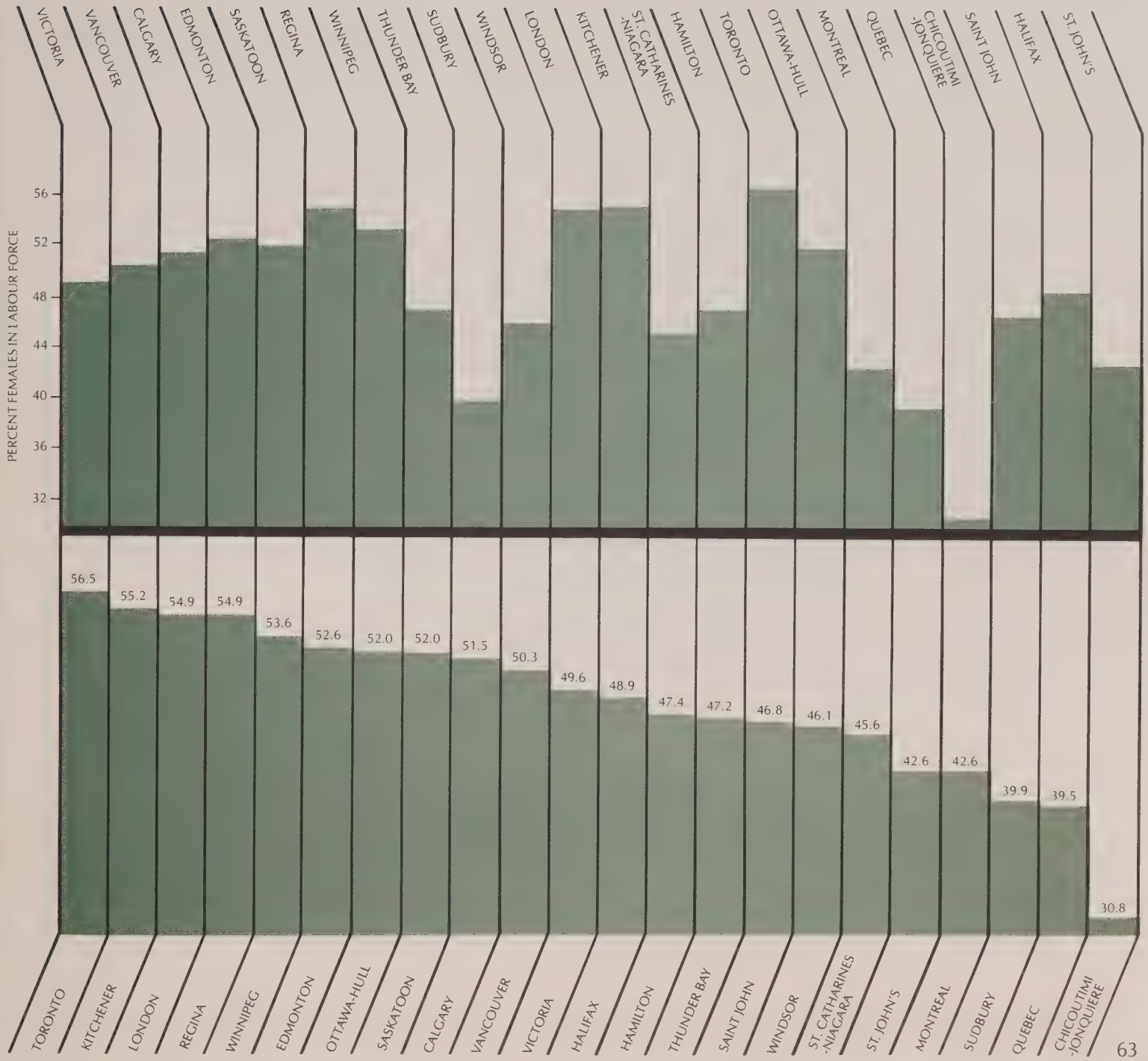
SOURCE:
Statistics Canada, 1971 Census of Canada, Catalogue 94–719, 1974.


OCCUPATIONAL STATUS* INDEX
9.0
8.0
7.0
6.0
5.0
4.0
VICTORIA
VANCOUVER
CALGARY
EDMONTON
SASKATOON
REGINA
WINNIPEG
THUNDER BAY
SUDBURY
WINDSOR
LONDON
KITCHENER
ST. CATHARINES -NIAGARA
HAMILTON
TORONTO
OTTAWA-HULL
MONTREAL
QUEBEC
CHICOUTIMI -JONQUIERE
SAINT JOHN
HALIFAX
ST. JOHN'S
8.2
6.7
6.6
6.3
6.1
6.1
5.8
5.8
5.5
5.3
5.3
4.9
4.9
4.9
4.9
4.7
4.7
4.3
4.2
4.2
3.9
3.7
OTTAWA-HULL
QUEBEC
CALGARY
MONTREAL
TORONTO
SASKATOON
REGINA
HALIFAX
EDMONTON
ST. JOHN'S
LONDON
CHICOUTIMI -JONQUIERE
VANCOUVER
KITCHENER
WINNIPEG
WINDSOR
HAMILTON
SUDBURY
VICTORIA
THUNDER BAY
ST. CATHARINES -NIAGARA
SAINT JOHN

20. FEMALE LABOUR FORCE

ASPECT MEASURED	Female labour force participation rates reflect both the availability of job opportunities for women and the extent to which women are taking advantage of these. It is difficult to separate the two factors which jointly determine the participation rate: the employment market and preferences within the family.
CONSIDERATION OF THE MEASURE	1. AREA COVERAGE The coverage is the CMAs. The data are from the 1971 census. Areal sub-sampling is possible and thus comparisons of the inner city and the suburbs can be made. 2. TEMPORAL COVERAGE The data are available only for census years. 3. OTHER COVERAGE INCOMPATIBILITIES None are immediately apparent. 4. COLLECTION The data are available from Statistics Canada, 1971 Census of Canada, Catalogue 94–706, 1974. 5. COMPUTATION No computation is involved. The calculations are as reported in the publication.
OTHER MEASURES	A better measure of job opportunity for females would be a measure which matches the effective supply against the effective demand. This could only be accomplished through personal surveys of employers and a sample survey of all employable women. Even within the existing data, a finer breakdown of female labour force participation could prove helpful. For example, a breakdown by variation in the age of female workers would help to identify those who are re-entering the labour market as opposed to those who have been continuously employed.

SOURCE:
Statistics Canada, 1971 Census of Canada, Catalogue 94–706, 1974.

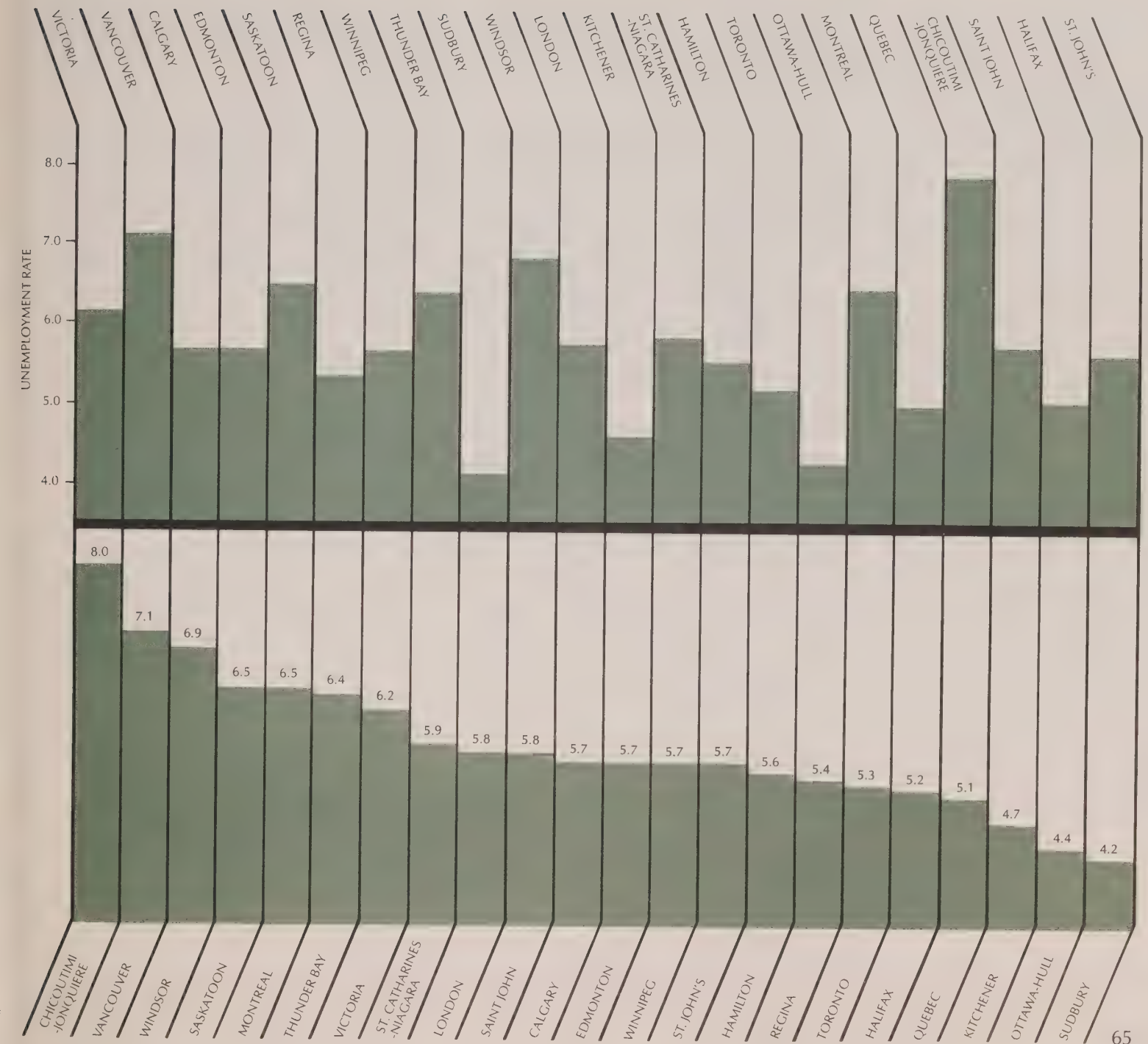

PERCENT FEMALES IN LABOUR FORCE
56
52
48
44
40
36
32
VICTORIA
VANCOUVER
CALGARY
EDMONTON
SASKATOON
REGINA
WINNIPEG
THUNDER BAY
SUDBURY
WINDSOR
LONDON
KITCHENER
ST. CATHARINES -NIAGARA
HAMILTON
TORONTO
OTTAWA-HULL
MONTREAL
QUEBEC
CHICOUTIMI -JONQUIERE
SAINT JOHN
HALIFAX
ST. JOHN'S
56.5
55.2
54.9
54.9
53.6
52.6
52.0
52.0
51.5
50.3
49.6
48.9
47.4
47.2
46.8
46.1
45.6
42.6
42.6
39.9
39.5
30.8
TORONTO
KITCHENER
LONDON
REGINA
WINNIPEG
EDMONTON
OTTAWA-HULL
SASKATOON
CALGARY
VANCOUVER
VICTORIA
HALIFAX
HAMILTON
THUNDER BAY
SAINT JOHN
WINDSOR
ST. CATHARINES -NIAGARA
ST. JOHN'S
MONTREAL
SUDBURY
QUEBEC
CHICOUTIMI -JONQUIERE

21. UNEMPLOYMENT

ASPECT MEASURED	Unemployment rate among the active labour force measures short-term, cyclical unemployment and is thus a measure of overall employment stability.[1] In general, this type of unemployment accounts for some 80% of all	unemployment in urban areas. The remaining 20% is accounted for by individuals who are new entrants into the labour force or who have no recent experience (i.e., within the past 18 months). The proportions are not separated out.
CONSIDERATION OF THE MEASURE	1. AREA COVERAGE Unemployment rates are available from the 1971 Census on a CMA basis. Thus comparisons could be had for areal sub-units such as the inner city and suburbs. 2. TEMPORAL COVERAGE Data are available only at the time of census taking. 3. OTHER COVERAGE INCOMPATIBILITIES None are readily apparent. 4. COLLECTION The data are published by Statistics Canada in the 1971 Census of Canada, Catalogue 94–703, 1974. More up-to-date data, on a metropolitan basis, are	unavailable, at least for all CMAs. The Labour Force Survey, which is carried out monthly, does not provide coverage of a sufficient number of CMAs. 5. COMPUTATION The unemployment rate among active labour force participants is the total number unemployed, less those with no recent work experience or no experience, as a percentage of the total labour force.
OTHER MEASURES	Unemployment rates are gross measures of employment stability. They do not account for differences among short-term cyclical and seasonal unemployment versus longer-run structural unemployment. Moreover they are insensitive to the numbers of persons affected, whether a few over a relatively long period or the converse. For instance a short-term widespread unemployment, given the improved Unemployment Insurance Program, is less harmful than long-term unemployment among certain core groups in the labour force. More refined measures would record unemployment rates arising from source	(technological change, shifts in demand for different occupations or adjustments for overproduction) and within occupational groups. However, the reality of the situation is that we lack good current and historical data of gross unemployment rates for urban areas. The data which are published are based on a very small sample, which does not permit estimates for most CMAs.

[1] Active is defined as having worked within the previous eighteen months.

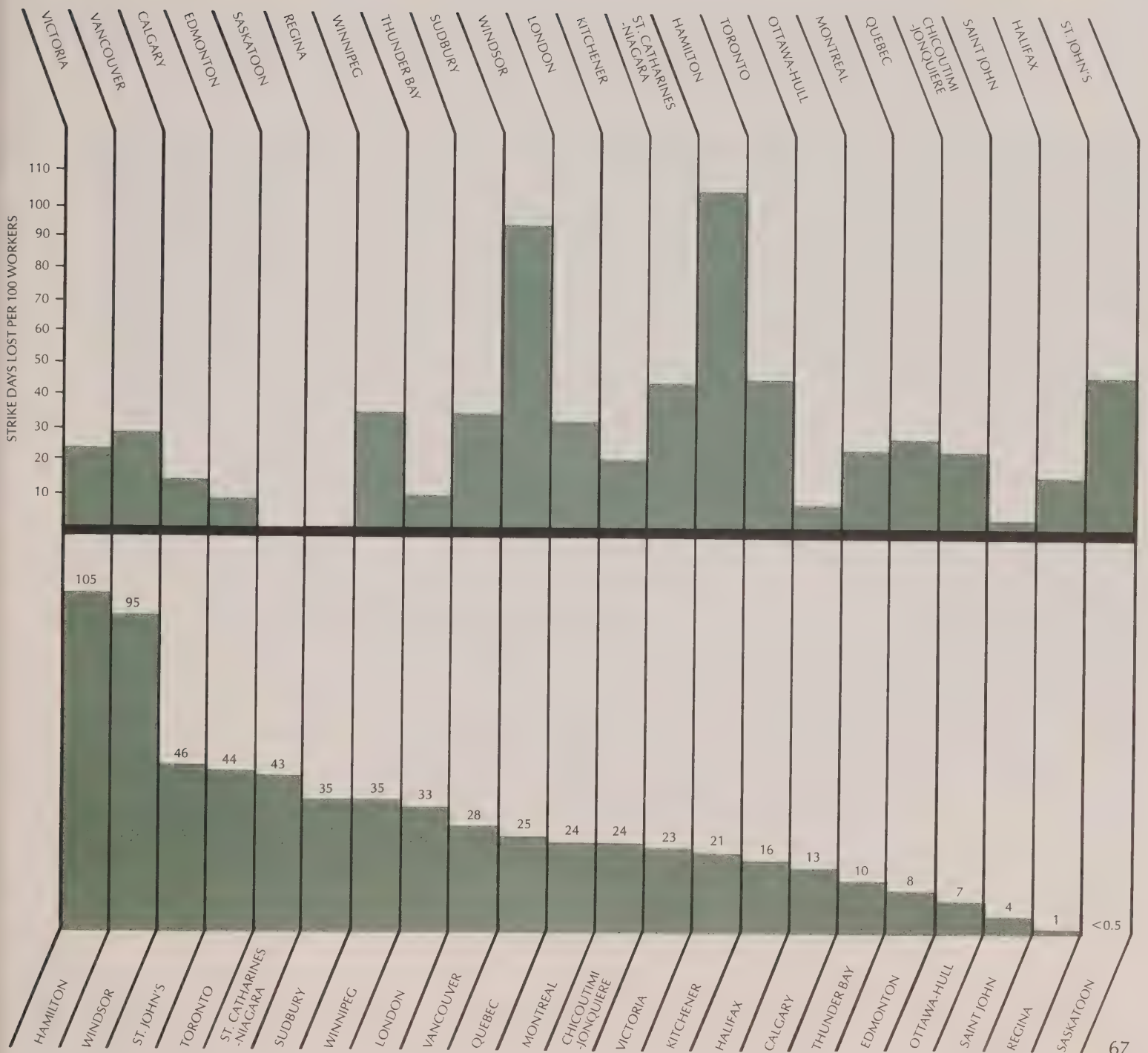
SOURCE:
Statistics Canada, 1971 Census of Canada, Catalogue 94–703, 1974.


UNEMPLOYMENT RATE
8.0
7.0
6.0
5.0
4.0
VICTORIA
VANCOUVER
CALGARY
EDMONTON
SASKATOON
REGINA
WINNIPEG
THUNDER BAY
SUDBURY
WINDSOR
LONDON
KITCHENER
ST. CATHARINES -NIAGARA
HAMILTON
TORONTO
OTTAWA-HULL
MONTREAL
QUEBEC
CHICOUTIMI -JONQUIERE
SAINT JOHN
HALIFAX
ST. JOHN'S
8.0
7.1
6.9
6.5
6.5
6.4
6.2
5.9
5.8
5.8
5.7
5.7
5.7
5.7
5.6
5.4
5.3
5.2
5.1
4.7
4.4
4.2
CHICOUTIMI -JONQUIERE
VANCOUVER
WINDSOR
SASKATOON
MONTREAL
THUNDER BAY
VICTORIA
ST. CATHARINES -NIAGARA
LONDON
SAINT JOHN
CALGARY
EDMONTON
WINNIPEG
ST. JOHN'S
HAMILTON
REGINA
TORONTO
HALIFAX
QUEBEC
KITCHENER
OTTAWA-HULL
SUDBURY

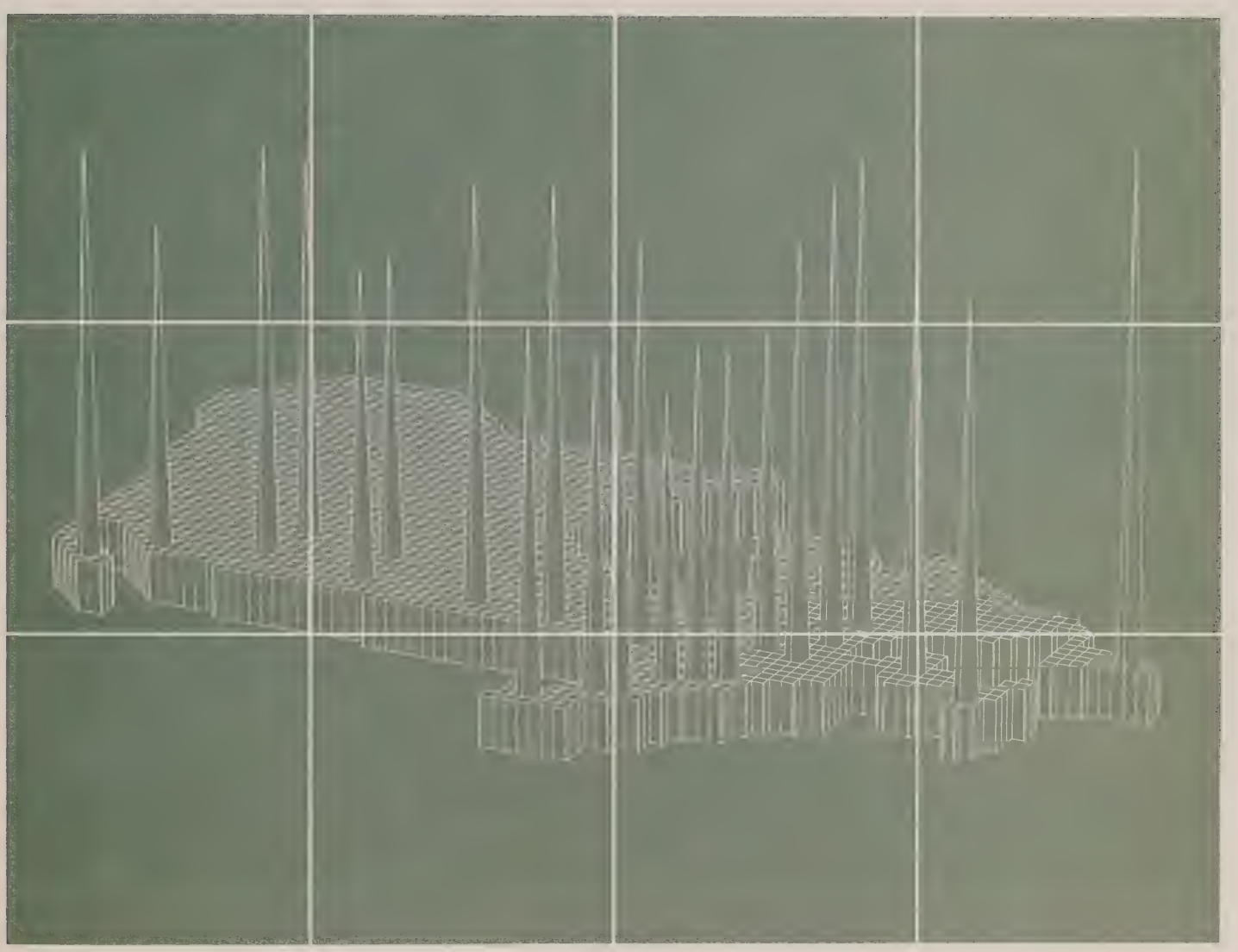
22. STRIKE DAYS LOST

ASPECT MEASURED	Strike days lost measure a breakdown in the consensus of the fairness of conditions under which workers labour. It is also a measure of loss of goods or services to the economy. In general, it could be argued that a high level of strikes reflects a high level of job dissatisfaction or job insecurity. Taken to the extreme, the index measures social breakdown.	
CONSIDERATION OF THE MEASURE	1. AREA COVERAGE The data are compiled from unpublished lists of strike days lost by firm, by industry sector and by municipal location. The locations can be aggregated readily to the CMA level (approximated). 2. TEMPORAL COVERAGE Data are collected routinely and compiled on a calendar year basis. However, printouts of strikes on a municipal and industry-sector basis are available only after a year or eighteen-month lag. This need not be the case. Labour force size data are taken from the 1971 Census, Catalogue 94-705, 1974. 3. OTHER COVERAGE INCOMPATIBILITIES The data are particularly vexing in two respects. The first is that industry-wide strikes, such as a strike of elevator installers, are recorded for a region as a whole (e.g., Ontario) and not for specific municipalities. In these instances one can only estimate the days lost in any one municipality. Second, rotating strikes are not allocated to specific communities, nor is the record of loss necessarily accurate, due to the short-term nature of the work stoppage.	4. COLLECTION The data are collected by local offices of Labour Canada and forwarded to headquarters in Ottawa. We do not know how consistent and accurate this type of reporting is. Much depends on the motivation of local staff and the way in which the information relates to their overall job duties. 5. COMPUTATION The computation is a straightforward average of strike days lost per 100 persons in the labour force. The labour force figure must be estimated between census years.
OTHER MEASURES	The number of strike days lost does not give a full understanding of the impact of strikes. It tells little of the overall economic consequences, such as layoffs in other industries, or of actual production loss. Nor are the number of strikers cited. Does the strike involve few people over a long period or the converse? Moreover, the outcome of the strike is not known. Furthermore, strikes can result in improved working conditions and increased productivity which quickly offset the short-term economic costs. Other measures of the working environment would better gauge the condition of employment. One of these would be comparative figures on workman's compensation and injuries. Another would be the proportion of the labour force enrolled in pension plans at their place of work. A third would be a measure of the mobility of the labour force in terms of job turnover not related to promotion. A fourth would be the converse of the third, job change related to promotion. Most of the above information could be calculated from income tax returns and would provide a clearer view of current conditions.	

SOURCE:
Unpublished Labour Canada data for strike days and Statistics Canada data for labour force, 1971 Census of Canada, Catalogue 94-705, 1974.


STRIKE DAYS LOST PER 100 WORKERS
110
100
90
80
70
60
50
40
30
20
10
VICTORIA
VANCOUVER
CALGARY
EDMONTON
SASKATOON
REGINA
WINNIPEG
THUNDER BAY
SUDBURY
WINDSOR
LONDON
KITCHENER
ST. CATHARINES -NIAGARA
HAMILTON
TORONTO
OTTAWA-HULL
MONTREAL
QUEBEC
CHICOUTIMI -JONQUIERE
SAINT JOHN
HALIFAX
ST. JOHN'S
105
95
46
44
43
35
35
33
28
25
24
24
23
21
16
13
10
8
7
4
1
<0.5
HAMILTON
WINDSOR
ST. JOHN'S
TORONTO
ST. CATHARINES -NIAGARA
SUDBURY
WINNIPEG
LONDON
VANCOUVER
QUEBEC
MONTREAL
CHICOUTIMI -JONQUIERE
VICTORIA
KITCHENER
HALIFAX
CALGARY
THUNDER BAY
EDMONTON
OTTAWA-HULL
SAINT JOHN
REGINA
SASKATOON

PHYSICAL DEVELOPMENT



23. HOUSING COSTS

ASPECT MEASURED

The average cost of a new single-detached dwelling financed under NHA in a particular market will reflect what someone in that market is most often paying. The housing package purchased (how large, how well equipped, with what size lot, etc.) may vary from city to city; however, this average does represent what available housing will cost. The measure thus compares actual purchase prices rather than costs for comparable housing.

CONSIDERATION OF THE MEASURE

1. AREA COVERAGE
The cost figures are compiled for large urban centres and urban agglomerations of 40,000 or more, as well as for the 22 CMAs.
2. TEMPORAL COVERAGE
The data are collected quarterly in unpublished form and yearly averages are published annually in *Canadian Housing Statistics.*
3. OTHER COVERAGE INCOMPATIBILITIES
New single-detached dwellings financed under NHA represent only one type of dwelling unit, and these figures do not necessarily approximate the average for all resale housing or non-NHA financed new detached dwellings. The characteristics of the dwellings for which data are presented here vary from city to city. Other data show that there are differences in average size, land costs, construction costs, etc. between CMAs. CMHC also points out certain problems with the estimates:

"The cost estimates presented in these tables are made by loan applicants, either owner-applicants or builders, at time of approval. The data on land costs include estimates made by builders who develop their own land, and are usually based on local market values. It must be noted that these estimates, to the extent that they accurately reflect market values, vary with changing proportions of fully serviced, partially serviced, and unserviced lots. In the case of serviced lots, prices also vary with changes in the method of financing as between municipal financing, where part of the cost is covered by local improvement charges, and full financing by the builders or developers." (*Canadian Housing Statistics,1976*, p. 106.)

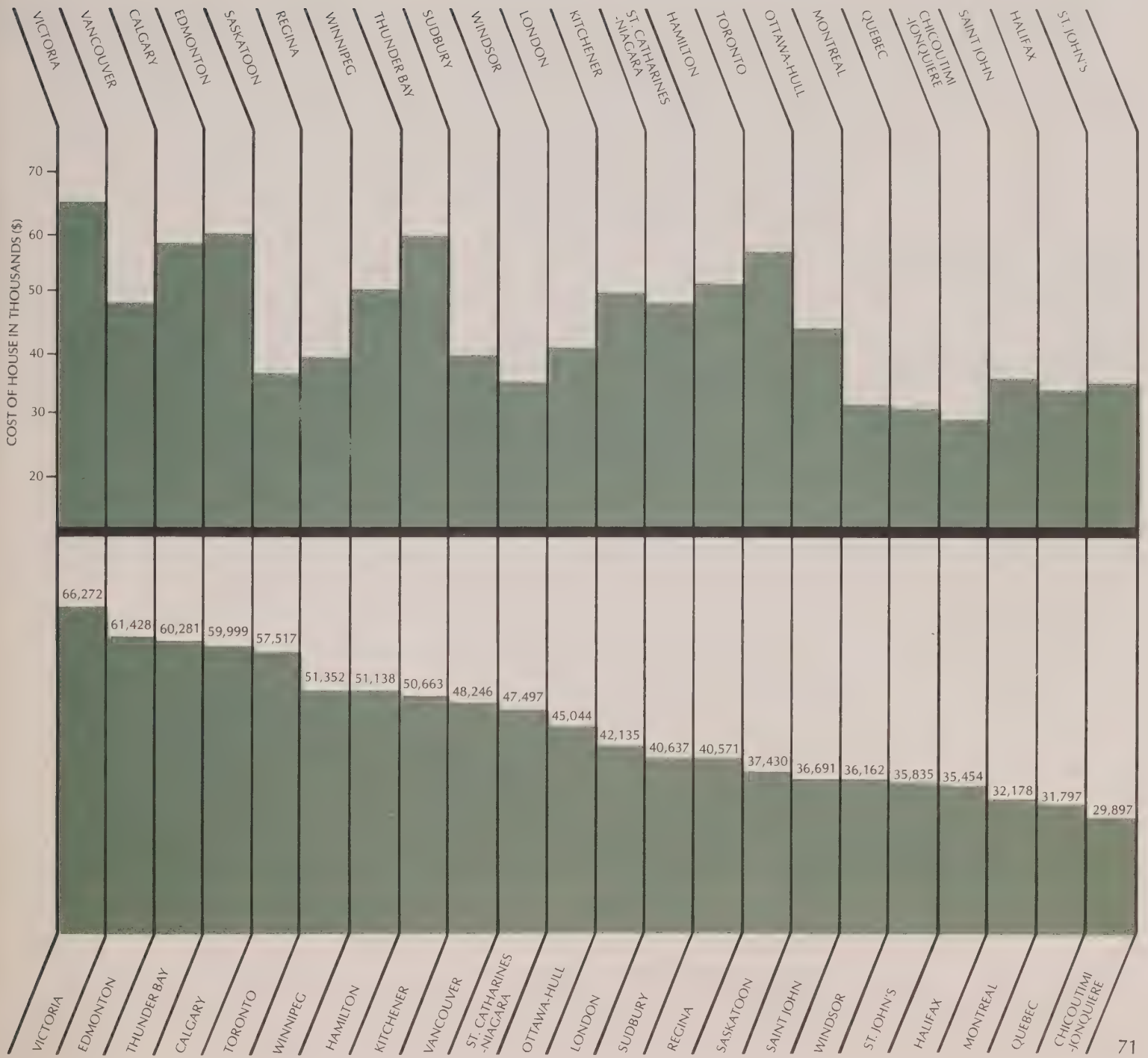
4. COLLECTION
Data are collected quarterly by CMHC regional offices, compiled in the *Statistical Handbook* and published annually in *Canadian Housing Statistics.*
5. COMPUTATION
Figures are taken directly from tabulations by CMHC.

OTHER MEASURES

As outlined above, these cost figures represent only a limited part of the housing market. Costs for other types of housing are available from real-estate boards, trust companies and some of the larger nation-wide corporations which index salaries on the basis of housing costs. The only measures of housing costs for both owner-occupied and rental dwellings are those collected for the census, which are consequently available only once every ten years in Catalogue 93-732.

SOURCE:
CMHC, *Canadian Housing Statistics 1976*, 1977 edition.

AVERAGE (MEAN) ESTIMATED TOTAL COSTS FOR NEW SINGLE-DETACHED DWELLINGS FINANCED UNDER NHA (1976)



24. HOUSING AFFORDABILITY: TENANTS

ASPECT MEASURED

Housing affordability is determined by the consumer's ability to pay. More specifically, affordability is measured as the expenditure-to-income ratio for a given tenant. Housing expenditures encompass the amount paid by a household to secure and maintain a dwelling unit and its facilities. For tenants, this amount includes the cash rent paid to secure occupancy of the dwelling, plus payment for facilities such as water, electricity, fuel, parking and other services that may be offered, such as on-site recreational facilities. The concept of income refers to the current income received by the household.

The measure then identifies the proportion of tenants renting accommodation who may find it difficult to afford a house. However, the housing expenditure-to-income ratio may in part reflect consumer spending preferences. Rather than difficulties in affordability, an aggregate measure of affordability must be viewed with caution. Clearly, some families may choose to spend what other families consider to be a high proportion of their income on housing because they prefer relatively high-quality housing.

CONSIDERATION OF THE MEASURE

1. AREA COVERAGE

The urbanized core of the 22 CMAs.

2. TEMPORAL COVERAGE

Estimates of household and dwelling unit characteristics derived from the CMHC Housing Survey refer to the year 1974. Income data refer to the 1973 calendar year.

3. OTHER COVERAGE INCOMPATIBILITIES

A number of factors should be kept in mind when interpreting this measure:

a) The use of current income as an indication of ability to pay may prove misleading. Excluded from this measure are accumulated savings and the future income which the household members can potentially earn, given their education and occupational status.

b) Age profiles are another consideration. Data from the Survey reveal that the majority of tenants have household heads aged 35 years or younger. Since most of those in this age-group have yet to attain their peak earning capacity, their potential income and their ability to pay for housing is greater than indicated by the current income measure.

Conversely, elderly retired people who rent accommodation may have a high expenditure-to-income ratio since their current income is low. But the apparent housing affordability problem is offset by previously accumulated savings.

c) Rental payments include expenditures for recreation services in a significant proportion of new housing developments. This introduces an upward bias into the expenditures for housing services.

d) Another source of ambiguity is that the point at which affordability becomes a problem varies with level of income. In terms of the amount of money left to provide basic levels of other goods and services, a small housing expenditure-to-income ratio could prove onerous for families living at the poverty line, while an enormous ratio would not reflect similar affordability problems for families earning high incomes. Clearly, the 30% threshold employed here may only be regarded as a rough guideline.

e) Finally, since the data derived from a survey, it was necessary to study the level of sampling error. Examination of key variables suggests that the results are reliable at the metropolitan level, but less so for sub-populations.

4. COLLECTION

Data were collected by household interviews as part of the Survey of Housing Units conducted by CMHC and Statistics Canada in 1974. The sample was stratified by income levels.

5. COMPUTATION

Percentage calculations were based on the survey.

OTHER MEASURES

Significant improvements to the measure of housing affordability for tenants could derive from (1) including a measure or an estimate of accumulated savings in the income component and (2) focussing on a specific age-group which would effectively standardize the potential earning capacity of the households under consideration.

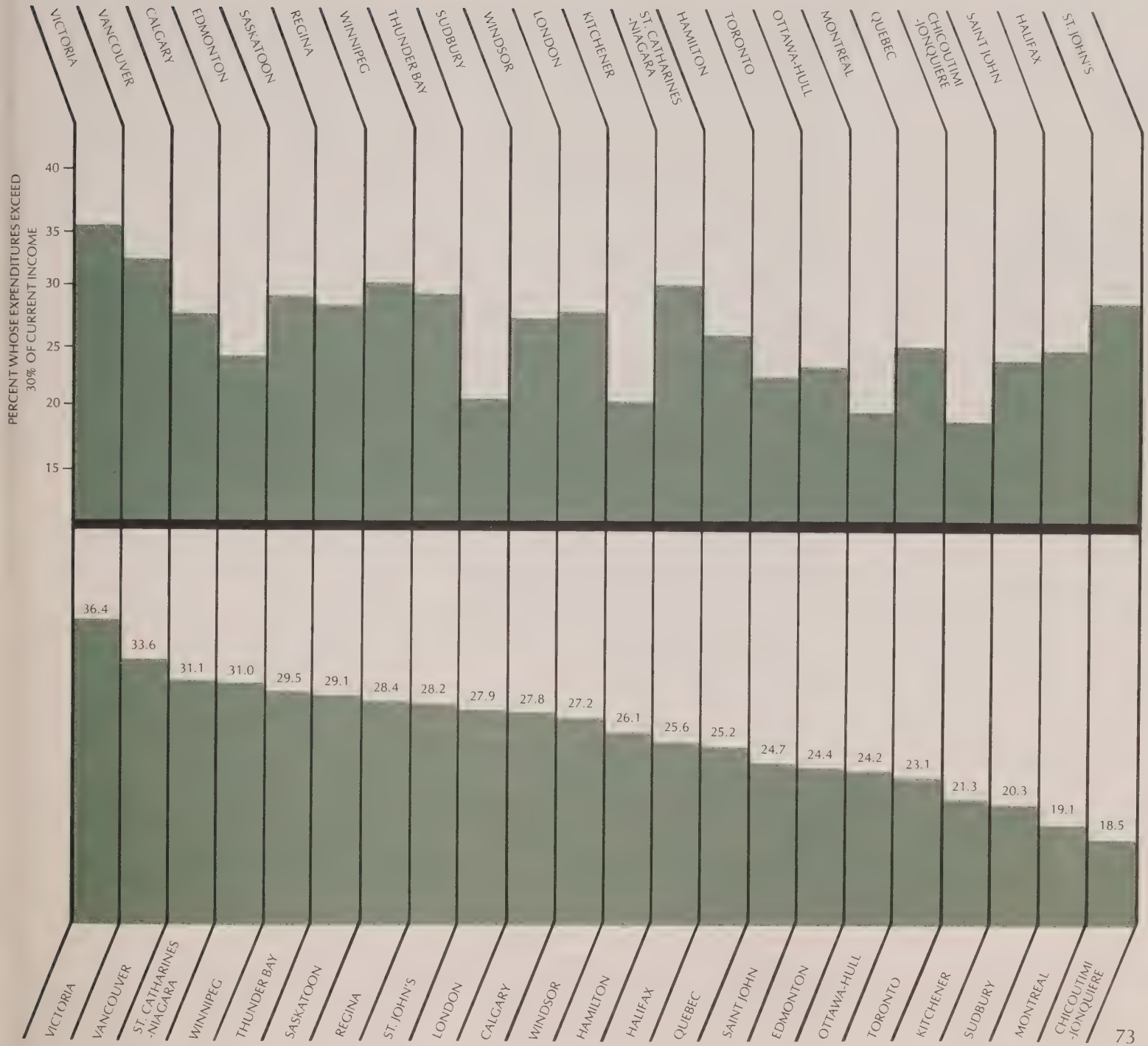
Another approach would be to produce the housing expenditure-to-income measure only for those segments of the population most susceptible to housing affordability problems (e.g., single-parent families).

SOURCES:

Central Mortgage and Housing Corporation, *1974 Survey of Housing Units*, Ottawa: CMHC, Program and Market Requirements Division, 1977 (24 vols.).

Hobart, Robert, *The Housing Market — Quality, Quantity and Affordability*, Ottawa: Ministry of State for Urban Affairs, June 1977 (mimeographed).

HOUSING AFFORDABILITY: PERCENTAGE OF TENANTS WHOSE HOUSING EXPENDITURES EXCEED 30% OF CURRENT INCOME (1974)



25. HOUSING AFFORDABILITY: OWNER-OCCUPANTS

ASPECT MEASURED

Housing affordability is determined by the consumer's ability to pay. More specifically, affordability is measured as the expenditure-to-income ratio for a given owner-occupant. Housing expenditures encompass the amount paid by a household to secure and maintain a dwelling unit and its facilities. For home owners, this includes the amount paid for principal, interest and taxes, as well as for utilities and services. The concept of income refers to the current income received by the household.

The measure then identifies the proportion of owner-occupants who may be experiencing housing affordability problems. However, the housing expenditure-to-income ratio may also reflect consumer spending preferences, rather than difficulties in affordability. Clearly, some families may choose to spend a higher proportion of their income on housing than other families because they place a greater value on high-quality housing.

CONSIDERATION OF THE MEASURE

1. AREA COVERAGE
The urbanized core of the 22 CMAs.
2. TEMPORAL COVERAGE
Estimates of household and dwelling unit characteristics derived from the CMHC Housing Survey refer to the year 1974. Income data refers to the 1973 calendar year.
3. OTHER COVERAGE INCOMPATIBILITIES
There are a number of factors which the reader must keep in mind when interpreting this measure.

a) The use of current income as an indicator of ability to pay may prove misleading. Excluded from this measure are accumulated savings and the future income which the household members can potentially earn, given their education and occupational status.
b) On the expenditure side of the equation, it is questionable whether payments on mortgage principal should be included in a measure of housing affordability. In the short run, principal repayments are expenditures, but, in the long run, they are a form of saving which the owner will recoup when the home is sold.
c) Moreover, the home itself is an asset which can appreciate in value as the price of the overall housing stock increases. Over the long run, therefore, the owner-occupied home is a source of income as well as an expenditure item.
d) Another source of ambiguity is that the point at which housing affordability can become a problem varies with level of income. In terms of the amount of money left to provide basic levels of other goods and services, a small housing-to-income ratio could represent a real burden to poor families, while a much larger ratio may pose few affordability problems to families earning high incomes. Hence, the affordability threshold of 30% employed here should only be regarded as a rough guideline.
e) Since the data were derived from a sample survey, it was necessary to study the level of sampling error. Examination of key variables suggests that the results are reliable at the overall metropolitan level, but less so for sub-populations.

4. COLLECTION
Data were collected by household interviews as part of the Survey of Housing Units conducted by CMHC and Statistics Canada in 1974. The sample was stratified by income levels.
5. COMPUTATION
Percentage calculations were based on the survey.

OTHER MEASURES

A complementary indicator is the measure of housing affordability for tenants. The relative significance of the two affordability measures varies between centres according to the percentage of owner-occupancy existing in a metropolitan area.

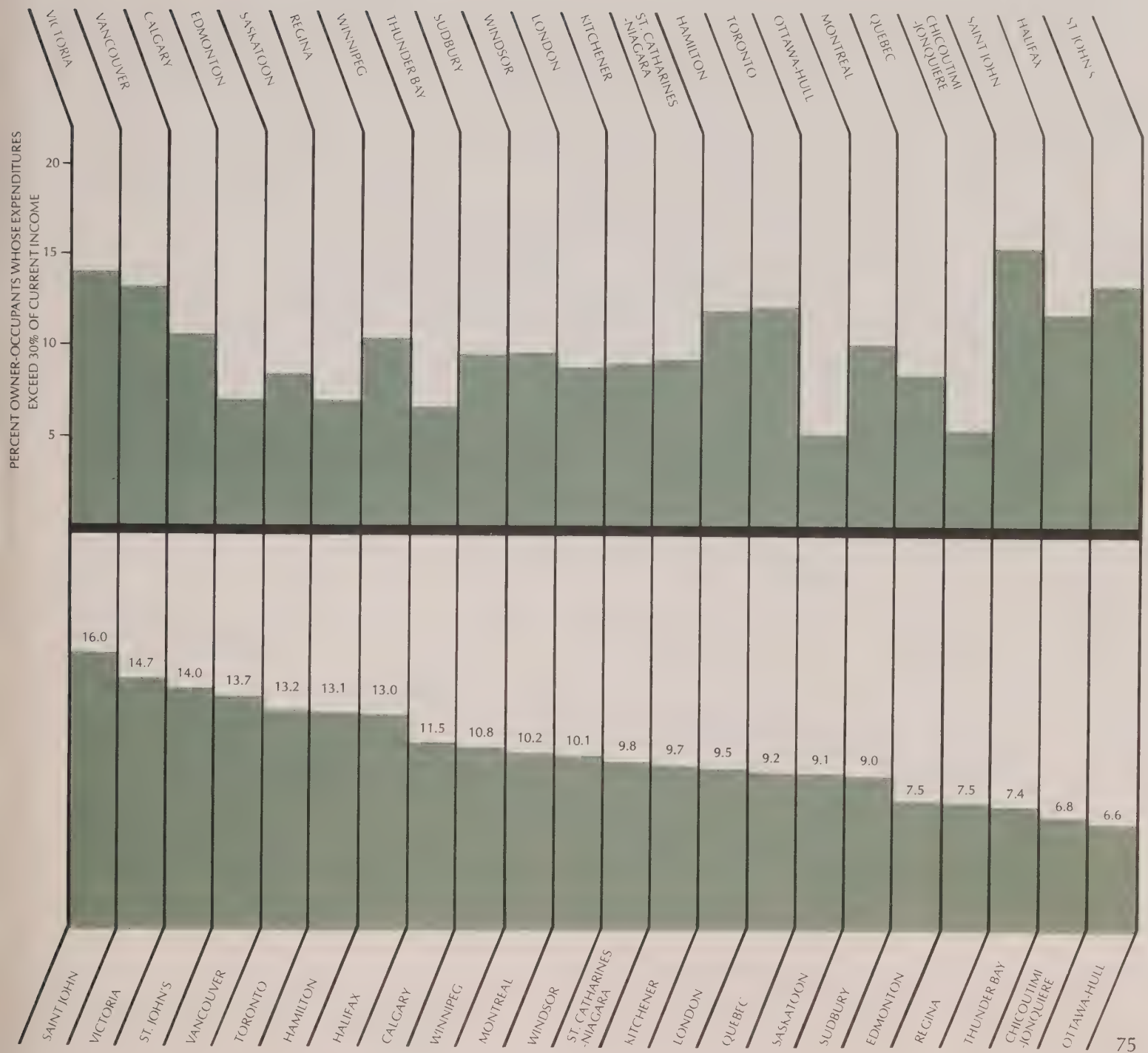
Another facet of the problem is an examination of the affordability of housing for prospective owner-occupants. Such information is not readily available but may be crudely estimated through the development of a budget model which incorporates (1) an estimate of the average carrying costs for the purchase of a modest home, (2) a measure of the after-tax income distribution, and (3) an estimate of the minimum expenditure required for non-housing goods and services to meet the basic needs of a family of four. For further details on this model, see Hobart (1977).

SOURCES:

Central Mortgage and Housing Corporation, *1974 Survey of Housing Units*, Ottawa: CMHC, Program and Market Requirements Division, 1977 (24 vols.).

Hobart, Robert, *The Housing Market — Quality, Quantity and Affordability*, Ottawa: Ministry of State for Urban Affairs, 1977 (mimeographed).

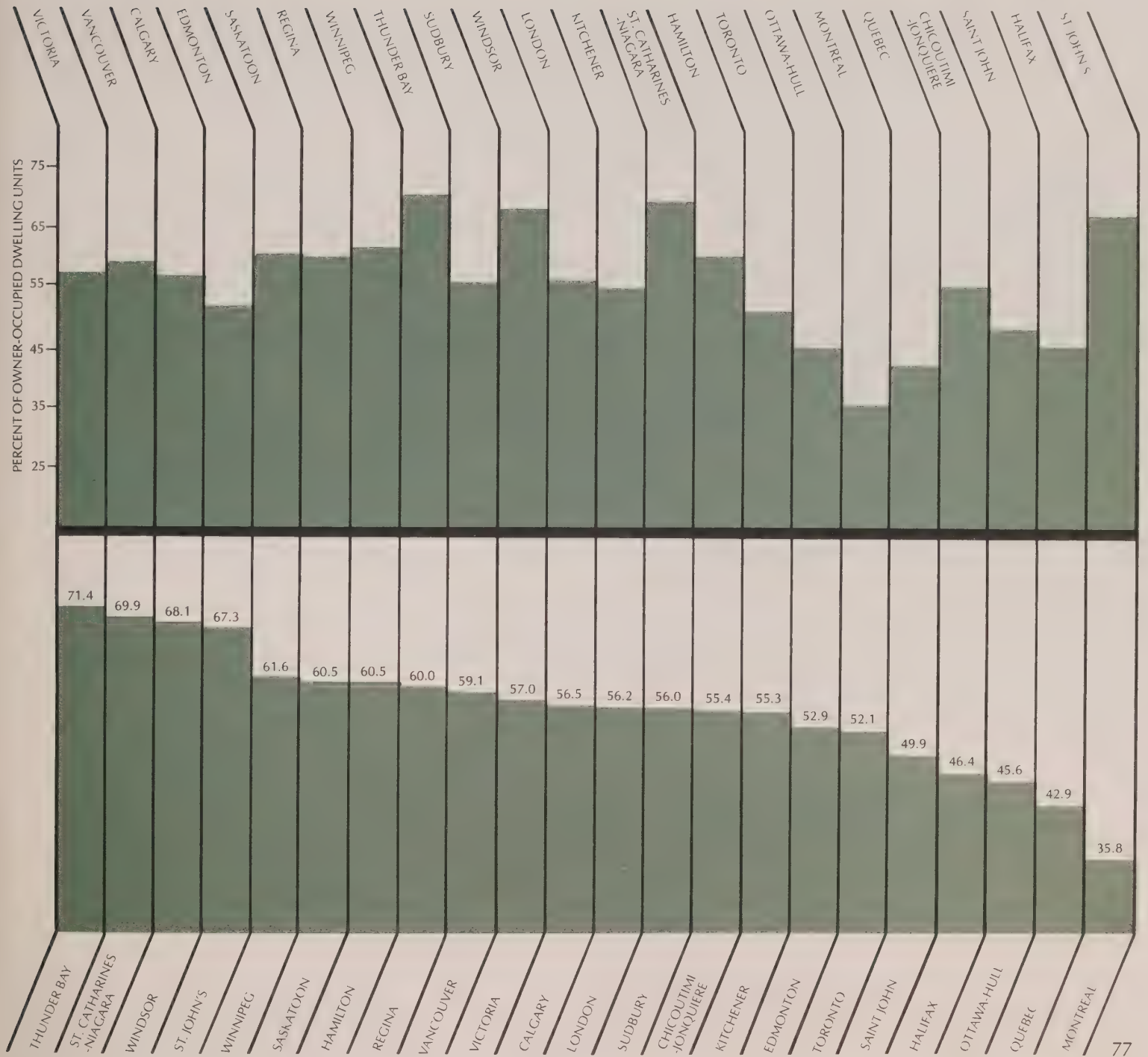
HOUSING AFFORDABILITY: PERCENTAGE OF OWNER-OCCUPANTS WHOSE HOUSING EXPENDITURES EXCEED 30% OF CURRENT INCOME



26. TENURE

ASPECT MEASURED	Occupancy status is a measure of ownership rates for dwelling units of all types. It is likely that those who own their dwelling have a greater interest in their community, are less transient, and may devote more time and money to maintaining and improving their home environment. Survey research has shown that most Canadians desire a house of their own and, consequently, this indicator shows the extent to which people in each city have realized that goal.
CONSIDERATION OF THE MEASURE	1. AREA COVERAGE In addition to the 22 CMAs presented here, data are available for large urban centres and urban agglomerations of 40,000 or more. 2. TEMPORAL COVERAGE Data used in estimates are available annually, while figures on actual distributions are collected for census years only. 3. OTHER COVERAGE INCOMPATIBILITIES None are immediately evident. 4. COLLECTION Base figures are from Statistics Canada, 1971 Census of Canada, Catalogue, 93-727, 1973. Estimates for 1974, as outlined below, are based on annual reporting of housing completions by type found in CMHC, *Canadian Housing Statistics.* 5. COMPUTATION On the basis of the percentages of dwelling units of each type (single-detached, single-attached and apartment) which were owner-occupied according to the 1971 Census, estimates were made of the number of new completions between 1971 and 1974 which would also have been owner-occupied. These new owner-occupied units were added to the total of existing owner-occupied units in 1971 (from the census figures) and a percentage calculated to estimate the 1974 distribution.
OTHER MEASURES	Other than an actual survey of tenure completed between census years, no other measures seem apparent.

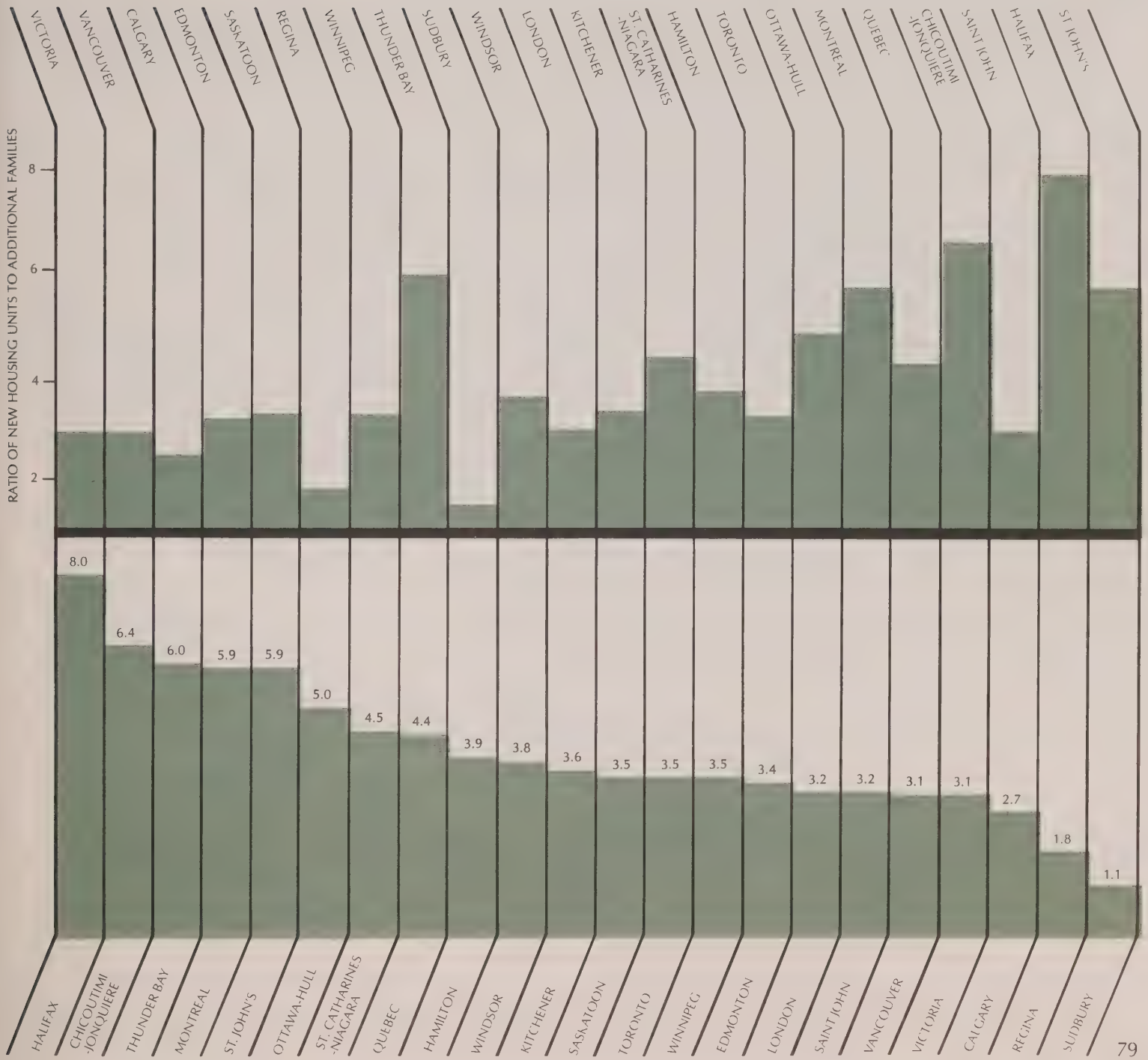
SOURCE:
Statistics Canada, 1971 Census of Canada, Catalogue 93-727, 1973, and CMHC, *Canadian Housing Statistics 1974*, 1975 edition.


PERCENT OF OWNER-OCCUPIED DWELLING UNITS
75
65
55
45
35
25
VICTORIA
VANCOUVER
CALGARY
EDMONTON
SASKATOON
REGINA
WINNIPEG
THUNDER BAY
SUDBURY
WINDSOR
LONDON
KITCHENER
ST. CATHARINES -NIAGARA
HAMILTON
TORONTO
OTTAWA-HULL
MONTREAL
QUEBEC
CHICOUTIMI -JONQUIERE
SAINT JOHN
HALIFAX
ST JOHN'S
71.4
69.9
68.1
67.3
61.6
60.5
60.5
60.0
59.1
57.0
56.5
56.2
56.0
55.4
55.3
52.9
52.1
49.9
46.4
45.6
42.9
35.8
THUNDER BAY
ST. CATHARINES -NIAGARA
WINDSOR
ST. JOHN'S
WINNIPEG
SASKATOON
HAMILTON
REGINA
VANCOUVER
VICTORIA
CALGARY
LONDON
SUDBURY
CHICOUTIMI -JONQUIERE
KITCHENER
EDMONTON
TORONTO
SAINT JOHN
HALIFAX
OTTAWA-HULL
QUEBEC
MONTREAL

27. NEW HOUSING PER ADDED HOUSEHOLD

ASPECT MEASURED	The ratio of number of new housing units to additional households is a measure of the balance between the supply and demand of housing; it thus reflects the range of housing choice available to those moving both within and between cities. In many cases, this balance will affect the cost of housing, since limited supply may force up prices. It is particularly important to know whether new construction is keeping up with increases in population in rapidly growing centres. This index compares the number of new units added to the housing stock with the number of additional households in the city during the same period. Both migration and family formation contribute to such increases in households.
CONSIDERATION OF THE MEASURE	1. AREA COVERAGE The index can be computed only for the 22 CMAs. 2. TEMPORAL COVERAGE The housing construction figures and growth estimates from which the index is computed are both collected annually. Housing statistics are available in March for the previous year, while publication time of population estimates varies. 3. OTHER COVERAGE INCOMPATIBILITIES Data on changes in total housing supply do not exist. Consequently the only changes which can be considered are additions to the stock because of new construction. Changes which result from demolitions and conversions are thus not considered. In the absence of actual annual population counts for the CMAs, population estimates must be used to derive growth rates, and in some cases the validity of these can be questioned (the 1973 estimate for Halifax was rejected for this reason). 4. COLLECTION Housing completions are published for calendar years by CMHC on the basis of reports from its regional offices. Estimated populations of the CMAs are published annually for June 1 of respective years by Statistics Canada, Catalogue 91-207. Household size averages come from the 1971 Census of Canada, Catalogue 93-702. 5. COMPUTATION The number of additional families was derived from estimates of total population growth divided by average household size in each CMA according to 1971 Census figures. The number of new units built between 1970 and 1973 was computed by summing completions for each of those years. The index is simply the latter divided by the former.
OTHER MEASURES	Ideally the housing supply/demand balance would be the total available housing divided by the number of households seeking accommodation. Available housing would include new units, existing vacant units and conversions, minus demolitions. The number of additional households would include migrants, newly-formed households, and undoubling. Better measures would include more of these variables when data are available, rather than simply the new units and the estimate of number of households used here.

SOURCE:
Statistics Canada, Catalogue 91-207 (annual), 93-702 (Census) and CMHC, *Canadian Housing Statistics 1974*, 1975 edition.


RATIO OF NEW HOUSING UNITS TO ADDITIONAL FAMILIES
2
4
6
8
VICTORIA
VANCOUVER
CALGARY
EDMONTON
SASKATOON
REGINA
WINNIPEG
THUNDER BAY
SUDBURY
WINDSOR
LONDON
KITCHENER
ST. CATHARINES -NIAGARA
HAMILTON
TORONTO
OTTAWA-HULL
MONTREAL
QUEBEC
CHICOUTIMI -JONQUIERE
SAINT JOHN
HALIFAX
ST JOHN'S
8.0
6.4
6.0
5.9
5.9
5.0
4.5
4.4
3.9
3.8
3.6
3.5
3.5
3.5
3.4
3.2
3.2
3.1
3.1
2.7
1.8
1.1
HALIFAX
CHICOUTIMI -JONQUIERE
THUNDER BAY
MONTREAL
ST. JOHN'S
OTTAWA-HULL
ST. CATHARINES -NIAGARA
QUEBEC
HAMILTON
WINDSOR
KITCHENER
SASKATOON
TORONTO
WINNIPEG
EDMONTON
LONDON
SAINT JOHN
VANCOUVER
VICTORIA
CALGARY
REGINA
SUDBURY

28. PROPORTION APARTMENT UNITS

ASPECT MEASURED

Housing type is an important aspect of the built environment of cities. The overall form of the city, particularly its skyline and density, is primarily affected by the proportion of apartments, as presented here. From the point of view of the home environment, housing type has a considerable impact on day-to-day activities and residential satisfaction. By measuring both the existing distribution and the rate at which additional apartments are being added by current construction, an idea of both current conditions and future trends can be obtained.

CONSIDERATION OF THE MEASURE

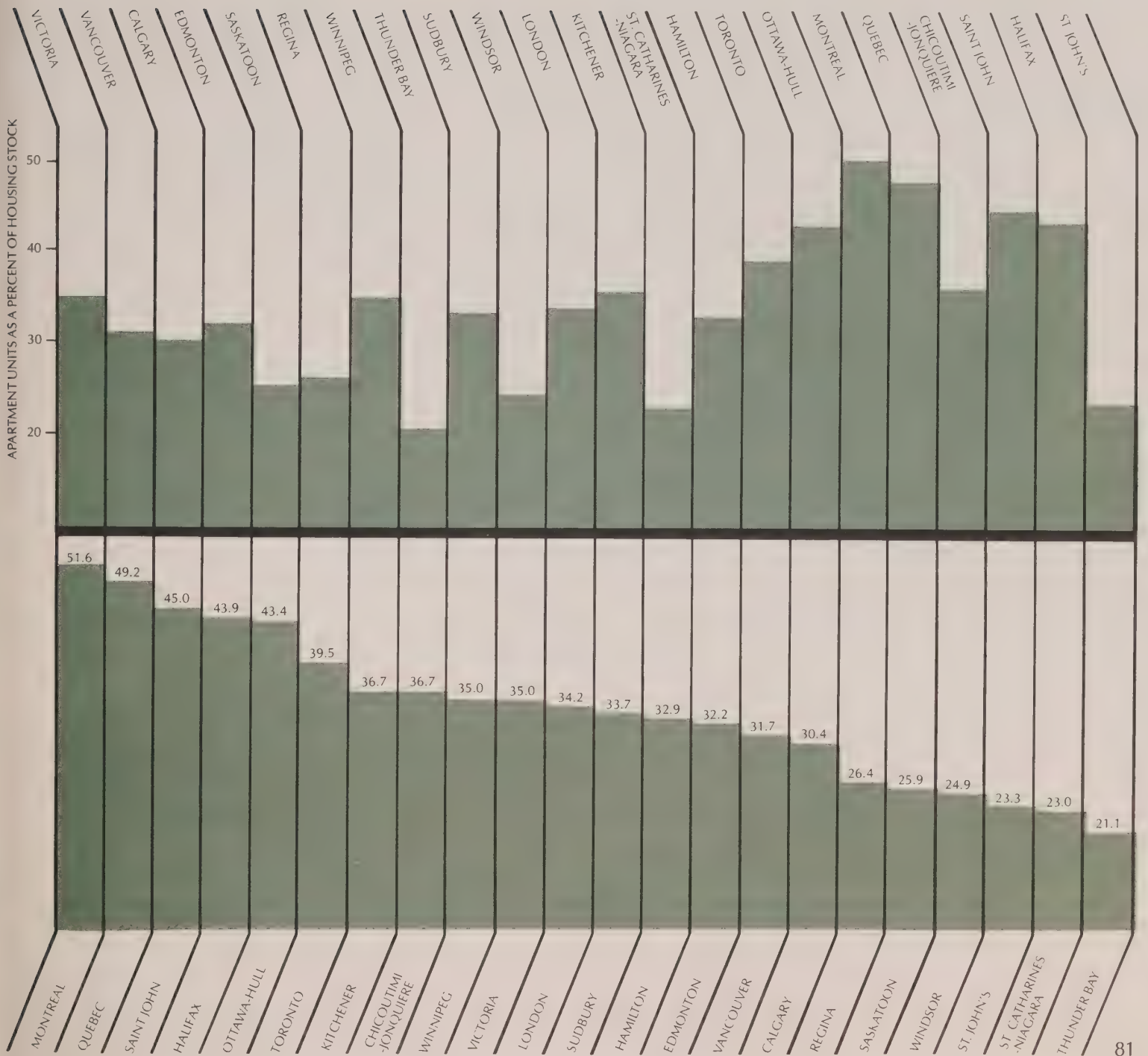
1. AREA COVERAGE
In addition to the 22 CMAs presented here, data are available for large urban centres and urban agglomerations of 40,000 or more.
2. TEMPORAL COVERAGE
Data used in estimates are available annually while figures on actual distributions are collected for census years only.
3. OTHER COVERAGE INCOMPATIBILITIES
Data on row housing are presented separately in *Canadian Housing Statistics,* while, in the census, row housing is tabulated as "single-attached" along with semi-detached. This makes it impossible to estimate the proportion of row housing — an increasingly important type of housing. Also the data do not permit calculations for type of housing demolished, which might change the proportions.
4. COLLECTION
Base figures on housing stock are from Statistics Canada, 1971 Census of Canada, Catalogue 93-727, 1973. Estimates for 1974, as outlined below, and 1974 starts are based on annual reporting on construction activity found in CMHC, *Canadian Housing Statistics*.
5. COMPUTATION
New completions between 1971 and 1974 by type were added to the existing distribution of housing type for 1971 from the census of that year, to give 1974 estimates. The percentage of apartments in the total stock was then calculated.[1]

OTHER MEASURES

Percentages of apartment units and housing distribution more generally reflect density. It would be of interest to have direct reporting of density figures for each city, but these are not collected on a comparable basis. One other aspect of housing type involves the question of families and apartments. With an increasing number of families living in apartments, by choice or necessity, it would be interesting to have a measure of the number of children living in apartments in each city.

[1] Includes apartments, flats and duplexes but not row housing.

SOURCE:
Statistics Canada, 1971 Census of Canada, Catalogue 93-727, 1973, and CMHC, *Canadian Housing Statistics 1974*, 1975 edition.

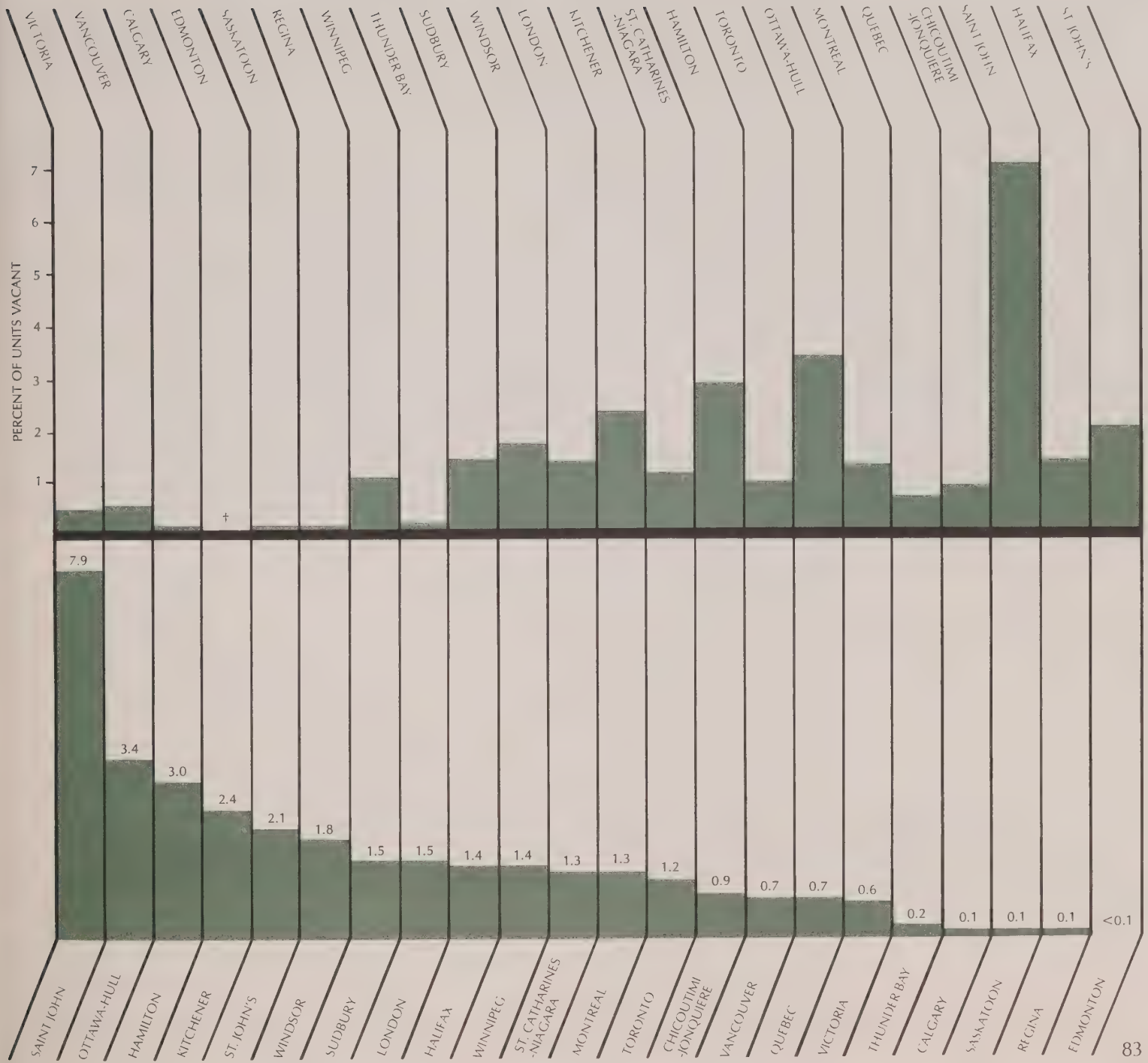

APARTMENT UNITS AS A PERCENT OF HOUSING STOCK
50
40
30
20
VICTORIA
VANCOUVER
CALGARY
EDMONTON
SASKATOON
REGINA
WINNIPEG
THUNDER BAY
SUDBURY
WINDSOR
LONDON
KITCHENER
ST. CATHARINES -NIAGARA
HAMILTON
TORONTO
OTTAWA-HULL
MONTREAL
QUEBEC
CHICOUTIMI -JONQUIERE
SAINT JOHN
HALIFAX
ST. JOHN'S
51.6
49.2
45.0
43.9
43.4
39.5
36.7
36.7
35.0
35.0
34.2
33.7
32.9
32.2
31.7
30.4
26.4
25.9
24.9
23.3
23.0
21.1
MONTREAL
QUEBEC
SAINT JOHN
HALIFAX
OTTAWA-HULL
TORONTO
KITCHENER
CHICOUTIMI -JONQUIERE
WINNIPEG
VICTORIA
LONDON
SUDBURY
HAMILTON
EDMONTON
VANCOUVER
CALGARY
REGINA
SASKATOON
WINDSOR
ST. JOHN'S
ST CATHARINES -NIAGARA
THUNDER BAY

29. APARTMENT VACANCY RATES

ASPECT MEASURED	Vacancy rates measure the extent to which those moving to or within a city have a choice of residence. It can also be expected that a moderate vacancy level — 3% according to most thinking	— is necessary to ensure some competition in prices. High vacancy rates will maximize choice, but exceptionally high rates may occasion instability in the residential construction industry.
CONSIDERATION OF THE MEASURE	1. AREA COVERAGE Data are collected for the 22 CMAs only. 2. TEMPORAL COVERAGE Vacancy rates are compiled twice yearly, in June and December. 3. OTHER COVERAGE INCOMPATIBILITIES Vacancy rates are collected only for apartment structures of six units and over, thus omitting a considerable proportion of rental units, particularly in those cities which do not have a high proportion of apartment units in larger buildings.	4. COLLECTION The data are collected by CMHC from its regional offices on the basis of a sample survey, and published annually, in March, for the preceding year, in *Canadian Housing Statistics.* 5. COMPUTATION The measure is taken directly from published figures.
OTHER MEASURES	The vacancy-rate measure presented here is only for apartments. A comparative figure for other types of units would be useful. It is also possible to consider the average length of time resale housing is on the market before being sold, and the length of time between completion and sale of new housing.	

SOURCES:
CMHC, *Canadian Housing Statistics 1976*, 1977 edition.

HOUSING CHOICE: VACANCY RATES IN APARTMENT STRUCTURES
OF SIX UNITS AND OVER (OCTOBER 1976)



30. HOUSING: STRUCTURAL CONDITION

ASPECT MEASURED

The proportion of the housing stock considered to be in unsatisfactory structural condition provides a measure of the percentage of dwelling units in need of repair. The overall condition of buildings was assessed on the basis of exterior elements: roofs, eaves, walls, windows, sills, footings and grading. The rating of structural condition should not be construed as a measure of general housing adequacy or quality since a wide range of differences in critical attributes (including site, location and facilities) exists among houses which do not need repairs, or for that matter, among houses which do.

CONSIDERATION OF THE MEASURE

1. AREA COVERAGE
The urbanized core of the 22 CMAs.
2. TEMPORAL COVERAGE
Estimates of household and dwelling unit characteristics derived from the survey refer to the year 1974.
3. OTHER COVERAGE INCOMPATIBILITIES
Since the data were derived from a sample survey, it was necessary to study the level of sampling error in interpreting the measure. Examination of key variables suggests that the results are reliable at the overall metropolitan level, but less so for sub-populations.

Previous survey experience in the evaluation of the structural condition of dwelling units suggests that such results must be viewed with circumspection. Both the Canadian census and the U.S. census have found structural condition measures to be unreliable, primarily because of error introduced by enumerator bias.

A final caveat concerns the restriction of the structural condition measure to exterior dwelling characteristics. On this basis, a dwelling might be classed as in good condition yet suffer from many serious interior shortcomings to its heating, plumbing and electrical systems that make life uncomfortable at best, or hazardous at worst, for the inhabitants.
4. COLLECTION
Data were collected by household interviews as part of the Survey of Housing Units conducted by Central Mortgage and Housing Corporation and Statistics Canada in 1974.

Dwellings were classed as poor, fair or good, according to the presence or absence of the following exterior dwelling characteristics which were noted by the enumerator: sagging roof, sloping walls, poor foundations, decaying wood, missing shingles, sagging eaves, broken windows, loose bricks, poor porch footings, poor paint, or poor grading.
5. COMPUTATION
Percentage calculations were based on the survey.

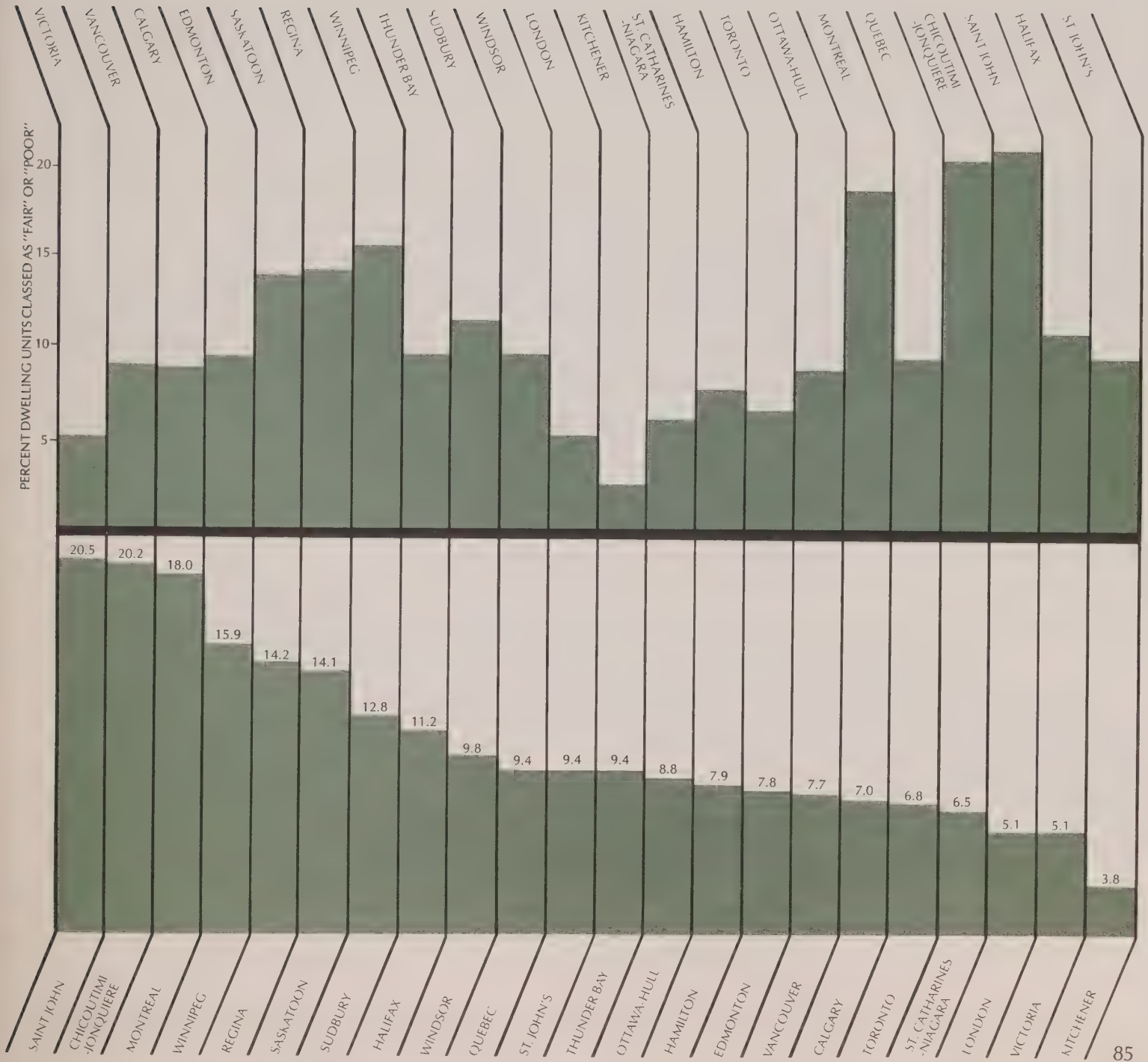
OTHER MEASURES

A possible proxy measure for structural condition is the age of the dwelling unit or, more precisely, the period in which the building was originally constructed. Cross tabulations of the age and structural condition of dwellings based on the 1974 Survey of Housing Units depict a reasonably strong relationship between these characteristics. Nevertheless, the reliability of the measurement may prove problematical since many occupants are uncertain about the exact age of older housing units. More important, however, is the relatively tenuous link between the age and the quality of housing. While dwellings tend to deteriorate over time, frequency and extent of repairs is a crucial factor affecting housing conditions on which information has not been collected. Moreover, many of the oldest dwellings which survive were built to more spacious and durable standards than those commonly utilized in current construction practices, and remain superior in some respects to newer units. Hence, age of dwelling is only partially indicative of structural conditions in particular, and housing adequacy in general.

A composite measure of housing quality or adequacy may be based on the presence of certain household facilities. Information on facilities, such as running water, flush toilets and heating equipment, is collected during the decennial census. But such measures have limited application. Although housing quality, thus defined, may prove useful for the identification of sub-standard areas and inadequately housed groups, residential units in metropolitan areas without these basic facilities are so rare as to be almost peculiar. Data are also obtainable on major appliances which have not yet saturated the housing market, including freezers, dryers and dishwashers, but these household amenities are not such basic facilities that their presence directly distinguishes adequate from inadequate housing.

SOURCE:
Central Mortgage and Housing Corporation, *1974 Survey of Housing Units*, Ottawa: CMHC, Program and Market Requirements Division, 1977 (24 vols.).

HOUSING QUALITY — STRUCTURAL CONDITION: PERCENTAGE OF DWELLING UNITS CLASSED AS "FAIR" OR "POOR"



31. HOUSING DENSITY

ASPECT MEASURED

A common finding of housing studies is that people generally prefer more rather than less dwelling space. Hence, household density, the amount of living space per person in a housing unit, may be regarded as a rough indicator of residential satisfaction. The measure identifies the proportion of households residing in moderately crowded circumstances.

Since crowded dwelling conditions have been shown to vary with stage in the family life cycle, attention is focussed exclusively on larger household units of four or more persons. Other things being equal, young families with children are likely to have less living space per person than single adults, childless couples or the elderly, regardless of their income level.

As a measure of residential satisfaction, household density is relatively crude, since it is often the internal dwelling layout and the use of space which more strongly affect the behaviour and satisfaction of residents. Similarly, the rating of household density should not be construed as an indicator of social pathology. The bulk of research to date has yielded no convincing evidence that crowded housing conditions of the extent experienced in Canada produce significant adverse effects on people's health, attitudes or behaviour.

CONSIDERATION OF THE MEASURE

1. AREA COVERAGE
The urbanized core of the 22 CMAs.
2. TEMPORAL COVERAGE
Estimates of household and dwelling unit characteristics derived from the CMHC Housing Survey refer to the year 1974.
3. OTHER COVERAGE INCOMPATIBILITIES
Since the data were derived from a survey, they are subject to sampling error. Examination of key variables suggests that the results are reliable at the metropolitan level, but less so for sub-populations.

Due to the well-known limitations on the use of rooms and bedrooms as measures of household density, the survey collected data on room dimensions. Dwelling area refers to the total area, in square feet, of all the rooms in the dwelling, calculated from these reported room dimensions. It does not include bathrooms, halls, garages, vestibules, unfinished attics or basements, and rooms used solely for business purposes.
4. COLLECTION
Data were collected by household interviews as part of the Survey of Housing Units conducted by CMHC and Statistics Canada in 1974.
5. COMPUTATION
The number of households of four or more persons with less than 200 square feet per person was calculated as a percentage of all households of four or more persons.

OTHER MEASURES

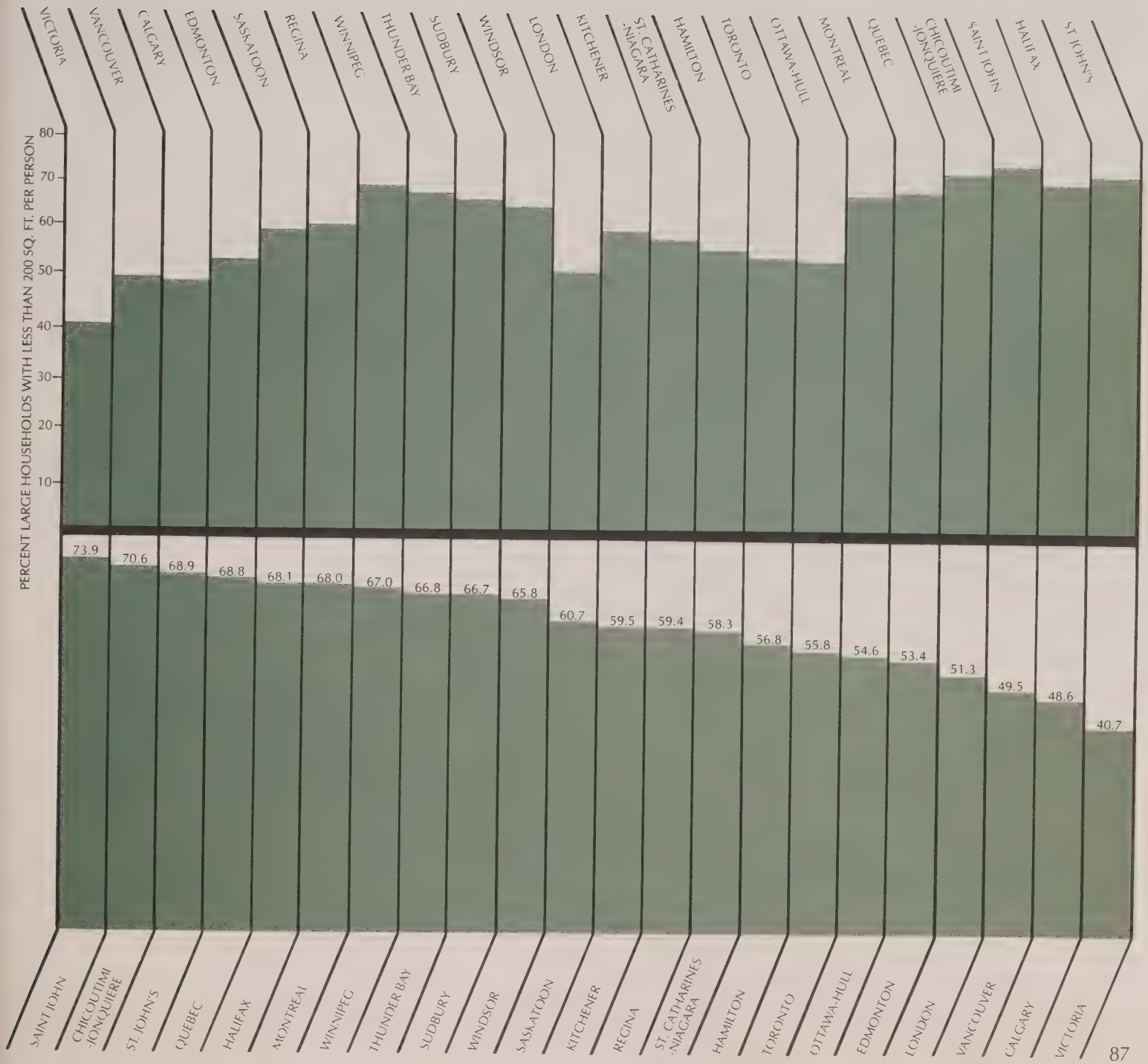
1. The conventional measure of household density has been based on the ratio of persons per room in a dwelling. Homes which exceeded one person per room were considered crowded. However, the ratio can prove misleading since the number of 'public rooms' in a dwelling — kitchen, living room, family room — is unlikely to increase systematically with household size. To resolve this difficulty, the measure "number of persons per bedroom" is sometimes used. But, both variables suffer from the problem of precisely defining a room and are also sensitive to differences in household composition.
2. Measures of geographic or site density include, in increasing order of precision, dwellings per acre, persons per acre, persons per net residential acre and persons or households per block face, standardized per front footage. In regard to density and residential satisfaction, the effect of this approach is to broaden the focus from the dwelling unit itself to encompass the wider neighbourhood.
3. Although it is usually conceded that people have a basic need for space and privacy, the extent of internal space demanded is to some degree a matter of personal taste that is traded off against the desire for other goods and amenities. Moreover, it has been argued that Canadian housing has generally reached such a level of basic adequacy in terms of space that crowding has become a less salient concern for most households. As a result, the quality of housing in terms of its condition, location, neighbourhood characteristics and community services has increasingly taken priority. Indicators of these aspects of housing quality have gained in importance.

SOURCES:

Shulman, N., *A Review of Selected Research on the Effects of Built Environment*, Ottawa: MSUA, Working Paper, June 1977.

Ycas, M., *A Brief Survey of Housing Indicators*, Ottawa: Statistics Canada, Household Statistics Branch, February 1977 (mimeographed).

DENSITY: PERCENTAGE OF LARGE HOUSEHOLDS WITH LESS THAN 200 SQUARE FEET OF LIVING SPACE PER PERSON

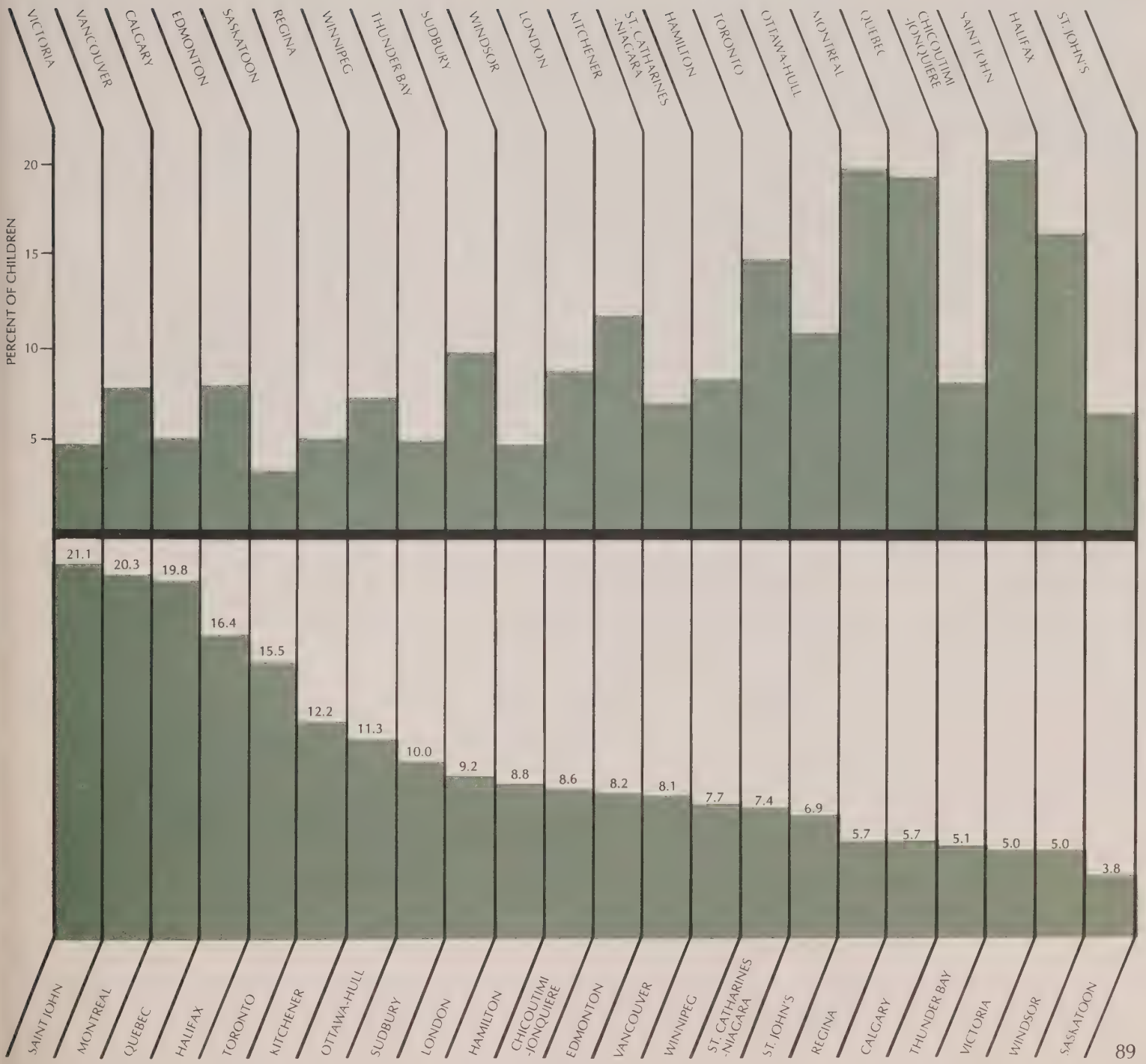


32. CHILDREN IN APARTMENTS

ASPECT MEASURED	The percentage of children[1] living in apartments can be seen to measure the extent to which the physical environment of the home may present problems for young families. Canadians still overwhelmingly prefer single-family housing, particularly for families with children. Apartment living may mean a lack of indoor and outdoor play areas for children, problems in supervising outdoor activities, and lack of audio and visual privacy within the dwelling.	The indicator consequently reflects the proportion of children in each CMA who may be living in difficult or even unsuitable environments.
CONSIDERATION OF THE MEASURE	1. AREA COVERAGE A special tabulation was made for CMAs, but presumably the data could be obtained for all census area units from the census tract up. 2. TEMPORAL COVERAGE Data are available for census years only. 3. OTHER COVERAGE INCOMPATIBILITIES The definition of children may be too inclusive. Also the age structures of the CMAs vary, with the result that there may be more "children" in some cities. However it is still important to identify what proportion are living in apartments.	4. COLLECTION The data were collected from a special tabulation using 1971 census data on file at Statistics Canada. 5. COMPUTATION The indicator was derived from a straight percentaging of number of children in apartments over total number of children under age 25 in each CMA.
OTHER MEASURES	It might be of greater interest to focus on children in particular age-groups, using the same data file. Other characteristics of the physical environments of children might also be of interest, but little data exist for these. However, the size of apartment building could be gauged, as could the floor on which children live — say the percentage of children living above the ground floor.	

[1] The census definition of children is sons and daughters under 25 years who have never married and are living at home.

SOURCE:
Statistics Canada, 1971 Census of Canada, Special Tabulation.


PERCENT OF CHILDREN
20
15
10
5
VICTORIA
VANCOUVER
CALGARY
EDMONTON
SASKATOON
REGINA
WINNIPEG
THUNDER BAY
SUDBURY
WINDSOR
LONDON
KITCHENER
ST. CATHARINES -NIAGARA
HAMILTON
TORONTO
OTTAWA-HULL
MONTREAL
QUEBEC
CHICOUTIMI -JONQUIERE
SAINT JOHN
HALIFAX
ST. JOHN'S
21.1
20.3
19.8
16.4
15.5
12.2
11.3
10.0
9.2
8.8
8.6
8.2
8.1
7.7
7.4
6.9
5.7
5.7
5.1
5.0
5.0
3.8
SAINT JOHN
MONTREAL
QUEBEC
HALIFAX
TORONTO
KITCHENER
OTTAWA-HULL
SUDBURY
LONDON
HAMILTON
CHICOUTIMI -JONQUIERE
EDMONTON
VANCOUVER
WINNIPEG
ST. CATHARINES -NIAGARA
ST. JOHN'S
REGINA
CALGARY
THUNDER BAY
VICTORIA
WINDSOR
SASKATOON

33. PUBLIC TRANSIT RIDERSHIP

ASPECT MEASURED

Fare passengers carried is the annual total of one-way fares carried. It is a measure of both the availability of public transit and the extent of its use. The potential number of passengers will depend upon the number of vehicles, length of routes, and so on. Usage will depend on quality of service, local preferences, costs and other factors. Taken together, these factors influence the extent to which public transit is used as a means of transportation by residents of each city.

CONSIDERATION OF THE MEASURE

1. AREA COVERAGE
Data on public transit are available on an annual basis for 20 CMAs. Thunder Bay and Victoria report infrequently and are not on master file. Data are based on the operations of the transit companies in the respective CMAs, although these do not necessarily cover the entire metropolitan area. No data exist for the Hull transportation system, so data for Ottawa alone is presented.
2. TEMPORAL COVERAGE
The data are collected annually, although there are some gaps, as is indicated in the footnotes. The most recent data are for 1972, so it seems that some time is required in processing before data become available.
3. OTHER COVERAGE INCOMPATIBILITIES
"Fare passengers carried" includes buses, trolleys, street cars, and subways. In most cities, buses are the exclusive mode of public transit. In Toronto and Montreal, the use of subways increases considerably the number of passengers carried.
4. COLLECTION
The data are collected and kept on file by Statistics Canada on the basis of reports by individual transit companies, and are consequently dependent on the diligence of those individuals who gather and relay this information.
5. COMPUTATION
The data are presented separately for buses, trolleys, street cars, other (i.e. subways), intercity-rural, and chartered. For this indicator, the first four — buses, trolleys, street cars, and other — were added and divided by 1972 estimated population from Statistics Canada, Catalogue 91-207.

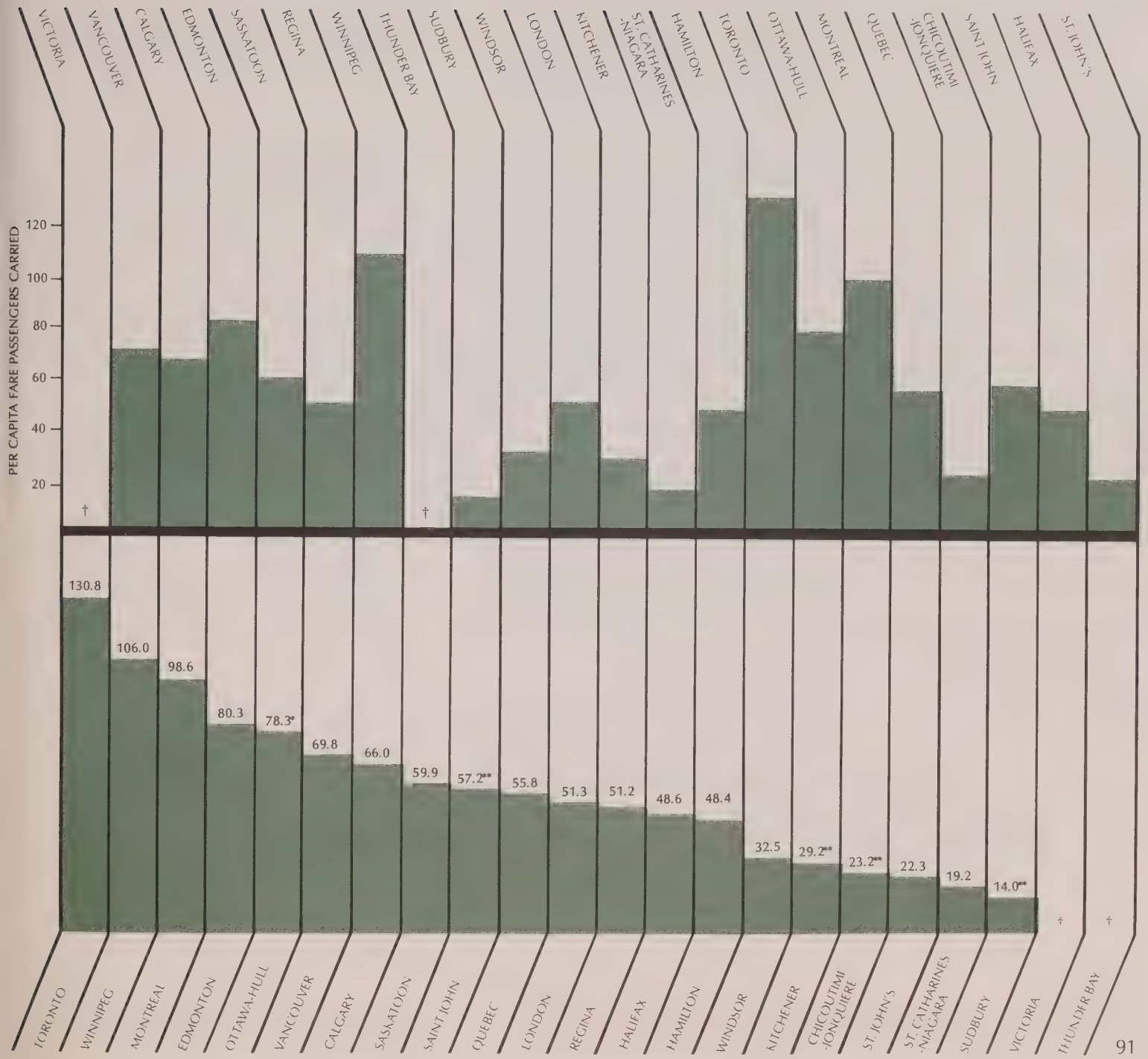
OTHER MEASURES

Availability of public transit can be measured in a number of different ways on the basis of data from the same source. These include: total miles of routes, seat miles (number of seats multiplied by number of miles) and actual numbers of rolling stock.

Of more interest would be measures of frequency of service, average time required for specified journeys and so on. However, these data are not at present collected. These measures should ultimately be compared to private transportation data on cost, access and the like.

*Ottawa only; does not include Hull and environs.
**1971 data

SOURCE:
Statistics Canada, unpublished data, 1972


PER CAPITA FARE PASSENGERS CARRIED
120
100
80
60
40
20
VICTORIA
VANCOUVER
CALGARY
EDMONTON
SASKATOON
REGINA
WINNIPEG
THUNDER BAY
SUDBURY
WINDSOR
LONDON
KITCHENER
ST. CATHARINES -NIAGARA
HAMILTON
TORONTO
OTTAWA-HULL
MONTREAL
QUEBEC
CHICOUTIMI -JONQUIERE
SAINT JOHN
HALIFAX
ST. JOHN'S
†
†
130.8
106.0
98.6
80.3
78.3*
69.8
66.0
59.9
57.2**
55.8
51.3
51.2
48.6
48.4
32.5
29.2**
23.2**
22.3
19.2
14.0**
†
†
TORONTO
WINNIPEG
MONTREAL
EDMONTON
OTTAWA-HULL
VANCOUVER
CALGARY
SASKATOON
SAINT JOHN
QUEBEC
LONDON
REGINA
HALIFAX
HAMILTON
WINDSOR
KITCHENER
CHICOUTIMI -JONQUIERE
ST. JOHN'S
ST. CATHARINES -NIAGARA
SUDBURY
VICTORIA
THUNDER BAY

34. AIR QUALITY: PARTICULATES

ASPECT MEASURED

Suspended Particulate Matter Counts measure pollutants which affect air quality. Other pollutants also affect air quality and may be more detrimental to health but, with the exception of sulphur dioxide, consistent data do not exist for these for the range of cities presented here. In fact, there is little agreement on which pollutants should be monitored or on their relative importance. Consequently, the validity of this indicator is open to serious question.

CONSIDERATION OF THE MEASURE

1. AREA COVERAGE
The data are collected by individual stations which belong to the National Air Pollution Surveillance Network (NAPS). The data may not be representative of the entire metropolitan area since levels are highly dependent on the location of stations, which may be situated in commercial, residential or industrial areas. Data on suspended particulate matter are collected for 20 CMAs.
2. TEMPORAL COVERAGE
Pollutant levels are monitored constantly and data may be made available on a monthly and even weekly basis. The annual geometric mean for each monitoring station in the NAPS Network is published yearly by Environment Canada. This is the most representative value of air pollution levels at a particular station.
3. OTHER COVERAGE INCOMPATIBILITIES
Comparisons between metropolitan centres should consider the type of monitoring stations, whether commercial, residential or industrial. Even when comparing pollutant levels between centres for one certain type of station, such as commercial, great caution still must be exercised because of (i) varying climatic conditions, (ii) different sampling equipment, procedures and measuring techniques, and (iii) interference from nearby emission sources.
4. COLLECTION
The data are collected by local monitoring stations, forwarded to the provinces and then sent to Environment Canada for compilation. The data here were assembled by Dr. H. Inhaber, formerly of the Science Policy Branch, Environment Canada.
5. COMPUTATION
The data presented are the mean values of the annual averages for all monitoring stations located in each metropolitan area. These annual averages are in turn the mean values of monthly averages at each station, which are calculated by taking 1/70th of the n root of the product of the weekly concentrations, according to the following equation:

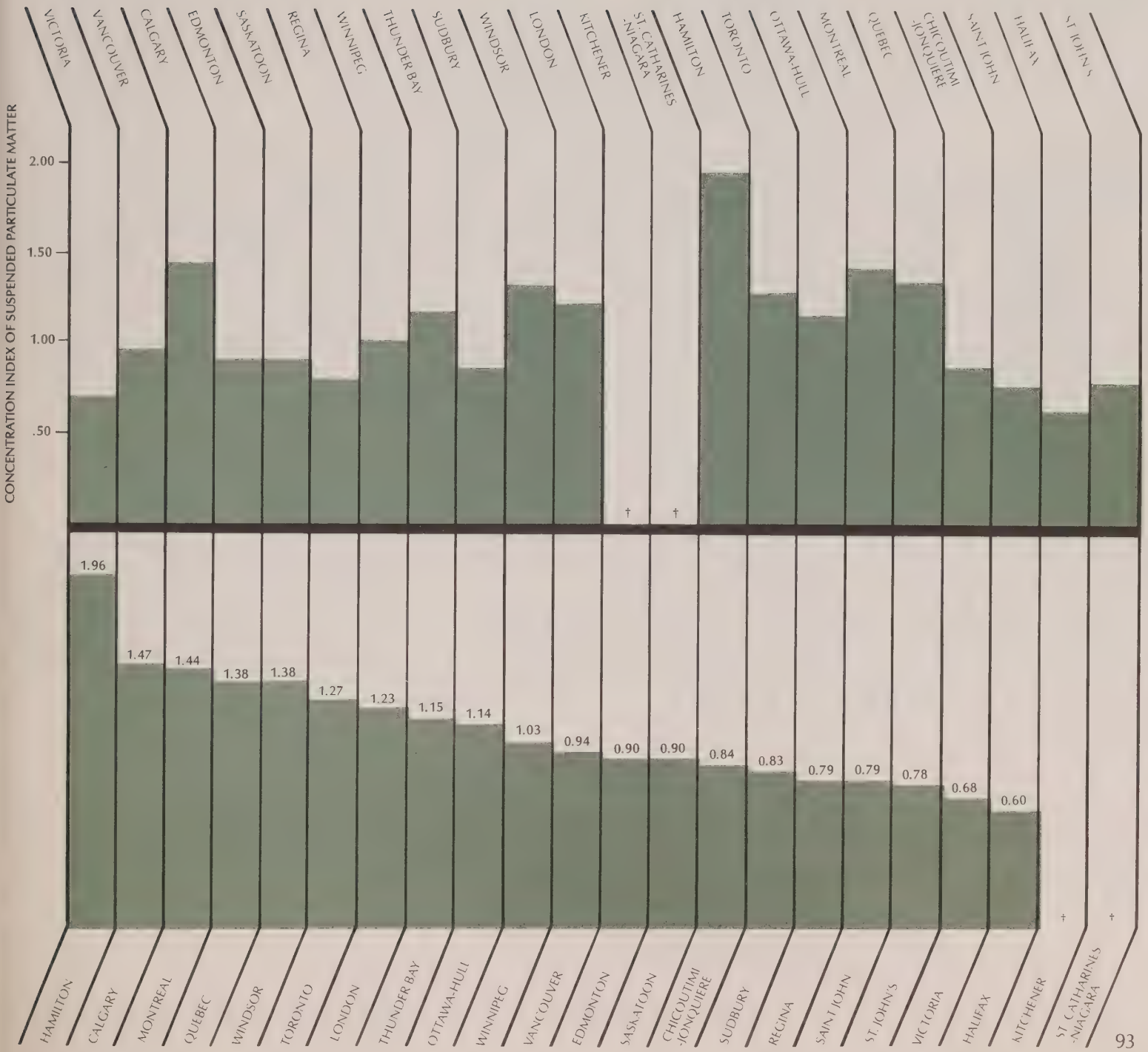
$$Ispm = \frac{\sqrt[n]{(C_1 \times C_2 \times C_3 \times \ldots\ldots C_n)}}{70}$$

where n is the number of weekly readings per station in a month, and C is the weekly concentration in micrograms per cubic metre. The figure $70 \mu g/m^3$ is the maximum annual acceptable level of the National Ambient Air Quality Objectives which is intended to provide adequate protection against effects on soil, water, vegetation, materials, animals, visibility, personal comfort and well-being.

OTHER MEASURES

Other pollutants considered detrimental to air quality are carbon monoxide, oxides of nitrogen, total oxides and lead. A coefficient of haze, which measures visibility as affected primarily by a particulate matter, is also recorded.

SOURCE:
Unpublished Data from the Science Policy Branch, Environment Canada.


CONCENTRATION INDEX OF SUSPENDED PARTICULATE MATTER
2.00
1.50
1.00
.50
VICTORIA
VANCOUVER
CALGARY
EDMONTON
SASKATOON
REGINA
WINNIPEG
THUNDER BAY
SUDBURY
WINDSOR
LONDON
KITCHENER
ST. CATHARINES -NIAGARA
HAMILTON
TORONTO
OTTAWA-HULL
MONTREAL
QUEBEC
CHICOUTIMI -JONQUIERE
SAINT JOHN
HALIFAX
ST JOHN'S
†
†
1.96
1.47
1.44
1.38
1.38
1.27
1.23
1.15
1.14
1.03
0.94
0.90
0.90
0.84
0.83
0.79
0.79
0.78
0.68
0.60
†
†
HAMILTON
CALGARY
MONTREAL
QUEBEC
WINDSOR
TORONTO
LONDON
THUNDER BAY
OTTAWA-HULL
WINNIPEG
VANCOUVER
EDMONTON
SASKATOON
CHICOUTIMI -JONQUIERE
SUDBURY
REGINA
SAINT JOHN
ST JOHN'S
VICTORIA
HALIFAX
KITCHENER
ST CATHARINES -NIAGARA

35. AIR QUALITY: SO_2

ASPECT MEASURED

Sulphur dioxide is a pollutant which affects air quality. Other pollutants also affect air quality and may be more detrimental to health, but consistent data (except for data on suspended particulate matter) do not exist for these for the range of cities presented here. In fact, there is little agreement on which pollutants should be monitored or on their relative importance. Consequently, the validity of this indicator is subject to question.

CONSIDERATION OF THE MEASURE

1. AREA COVERAGE
The data are collected by individual stations which belong to the National Air Pollution Surveillance Network (NAPS). The data may not be representative of the entire metropolitan area since levels are highly dependent on the location of stations which may be situated in commercial, residential or industrial areas. Data on sulphur dioxide are collected for 17 CMAs.

2. TEMPORAL COVERAGE
Pollutant levels are monitored constantly and data may be made available on a monthly and even weekly basis. The annual arithmetic mean for each monitoring station in the NAPS Network is published yearly by Environment Canada. This is the most representative value of air pollution levels at a particular station.

3. OTHER COVERAGE INCOMPATIBILITIES
Comparisons between metropolitan centres should consider the type of monitoring stations, whether commercial, residential or industrial. Even when comparing pollutant levels between centres for one certain type of station, such as commercial, great caution still must be exercised because of (i) varying climatic conditions, (ii) different sampling equipment, procedures and measuring techniques, and (iii) interference from nearby emission sources.

4. COLLECTION
The data are collected by local monitoring stations, forwarded to the provinces and then sent to Environment Canada for compilation. The data here were assembled by Dr. H. Inhaber, formerly of the Science Policy Branch, Environment Canada.

5. COMPUTATION
The data presented are the mean values of the annual averages for all monitoring stations located in each metropolitan area. These annual averages are calculated by taking the root mean square of the summation from $i = 1$ to n of the square of the daily concentration. This summation is then divided by n, the annual average concentration is added, and the result is multiplied by ½ of the inverse of the maximum annual acceptable objective. The procedure is described by the following mathematical expression:

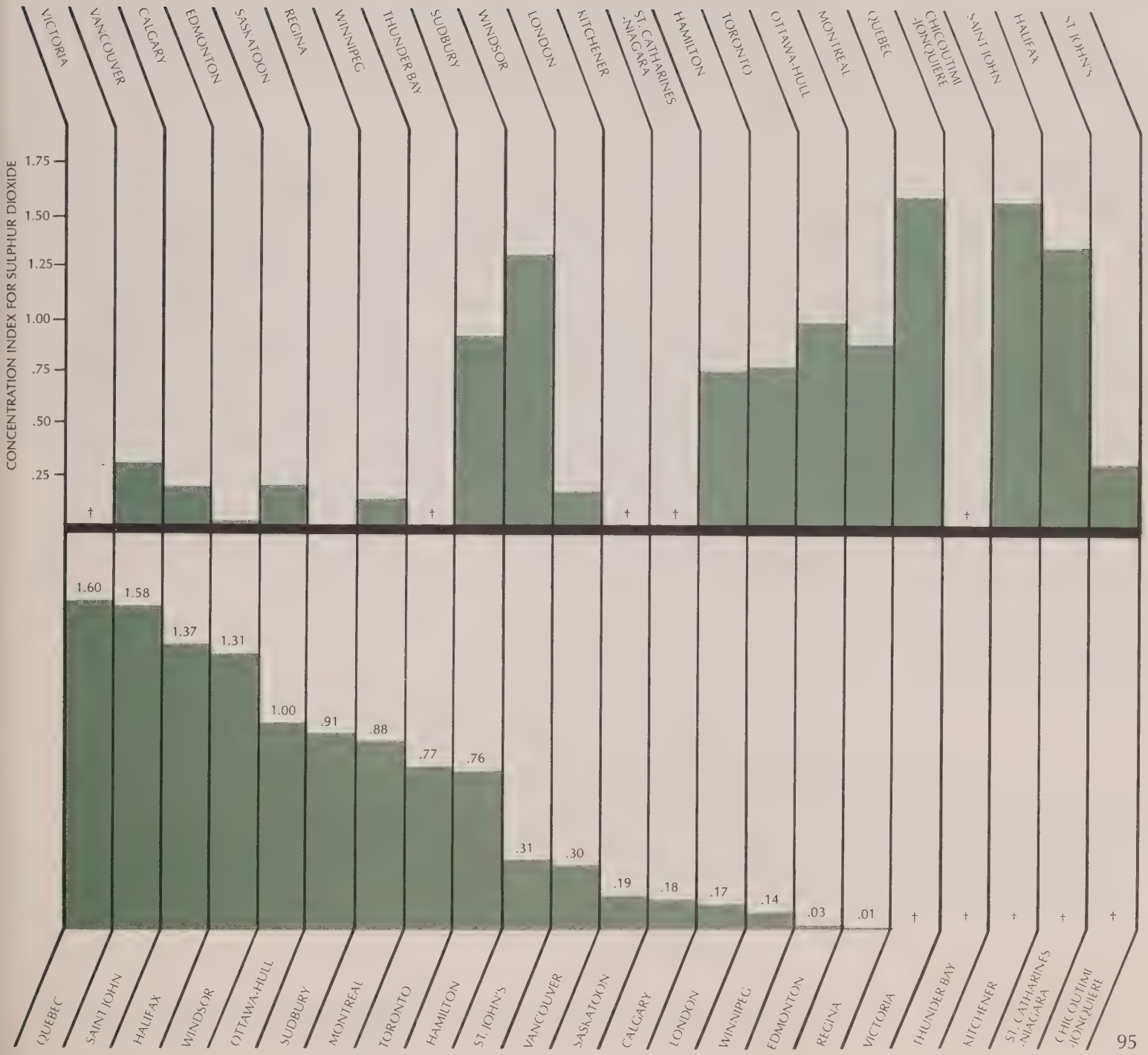
$$I_{SO_2} = 1/2 \times 1/.02 \left[Ca \Big/ \frac{\sum_{i=1}^{n} (Cd_i)^2}{n} \right]$$

where Ca is the annual average concentration in parts per million; Cd_i is the daily concentration and n is the number of readings in a month at a particular station. The level, .02 ppm, is the maximum annual acceptable level of the National Ambient Air Quality Objectives which is intended to provide adequate protection against effects on soil, water, vegetation, materials, animals, visibility, personal comfort and well-being.

OTHER MEASURES

Other pollutants considered detrimental to air quality are carbon monoxide, oxides of nitrogen, total oxides and lead. A coefficient of haze, which measures visibility as affected primarily by particulate matter, is also recorded.

SOURCE:
Unpublished Data from the Science Policy Branch, Environment Canada.


CONCENTRATION INDEX FOR SULPHUR DIOXIDE
1.75
1.50
1.25
1.00
.75
.50
.25
VICTORIA
VANCOUVER
CALGARY
EDMONTON
SASKATOON
REGINA
WINNIPEG
THUNDER BAY
SUDBURY
WINDSOR
LONDON
KITCHENER
ST. CATHARINES -NIAGARA
HAMILTON
TORONTO
OTTAWA-HULL
MONTREAL
QUEBEC
CHICOUTIMI -JONQUIERE
SAINT JOHN
HALIFAX
ST JOHN'S
†
1.60
1.58
1.37
1.31
1.00
.91
.88
.77
.76
.31
.30
.19
.18
.17
.14
.03
.01
QUEBEC
SAINT JOHN
HALIFAX
WINDSOR
OTTAWA-HULL
SUDBURY
MONTREAL
TORONTO
HAMILTON
ST. JOHN'S
VANCOUVER
SASKATOON
CALGARY
LONDON
WINNIPEG
EDMONTON
REGINA
VICTORIA
THUNDER BAY
KITCHENER
ST. CATHARINES -NIAGARA
CHICOUTIMI -JONQUIERE

36. HAZARD INDEX

ASPECT MEASURED

The hazard index measures the probability of property loss due to a fire or a traffic accident and thus is an indirect measure of safety.[1] We stress that this is not a measure of magnitude of damage, but solely of numerical incidence. The measure tends thus to reflect safety levels from an inconvenience aspect rather than from a physical damage aspect.

CONSIDERATION OF THE MEASURE

1. AREA COVERAGE
The areas covered are not compatible with CMAs. Thus the areas used here are major urban areas which are comprised of a grouping of municipalities to approximate the CMAs. The St. John's major urban area comprises 67% of the population of the actual CMA while the Calgary major urban area is synonymous with its CMA, and the St. Catharines-Niagara major urban area exceeds the size of its CMA by 14%. The end result is probably a higher value on the index for St. John's, Sudbury, Victoria, Halifax and Saint John than might be the case if a CMA estimate were employed, simply because the less urbanized areas are not included to the same degree as they are with other cities. Data at a submetropolitan scale are not readily available.

2. TEMPORAL COVERAGE
Data are reported annually, although two to three years elapse before publications become available. The traffic accident data are from Statistics Canada. The fire data are from the Annual Report of the Dominion Fire Commissioner.

3. OTHER COVERAGE INCOMPATIBILITIES
With the traffic enforcement data there may be regional differences in reporting accidents or in assessing the extent of damages. There may also be a bias insofar as non-local police forces do not record accidents occurring on provincial highways which pass through the municipality.

4. COLLECTION
The collection of traffic enforcement data is carried out by local police forces and compiled by Statistics Canada. Since these are official records, it is likely that accuracy is high. Data on fires are collected by local fire departments and compiled by the Dominion Fire Commissioner's office. Sources are Statistics Canada, *Traffic Enforcement Statistics 1971*, Catalogue 85-206, and the Annual Report of the Dominion Fire Commissioner, *Fire Losses in Canada 1971*.

5. COMPUTATION
The hazard index has two parts. First, the per capita number of traffic accidents where damage exceeds $100 is compiled. Second, a figure for the number of fires is compiled. The two are added and then divided by population to give the hazard index.

OTHER MEASURES

As a measure of safety, the hazard index should definitely be replaced. If the data were available, injuries and fatalities would be better measures of both traffic and fire accidents. It seems to be more appropriate to consider each separately.

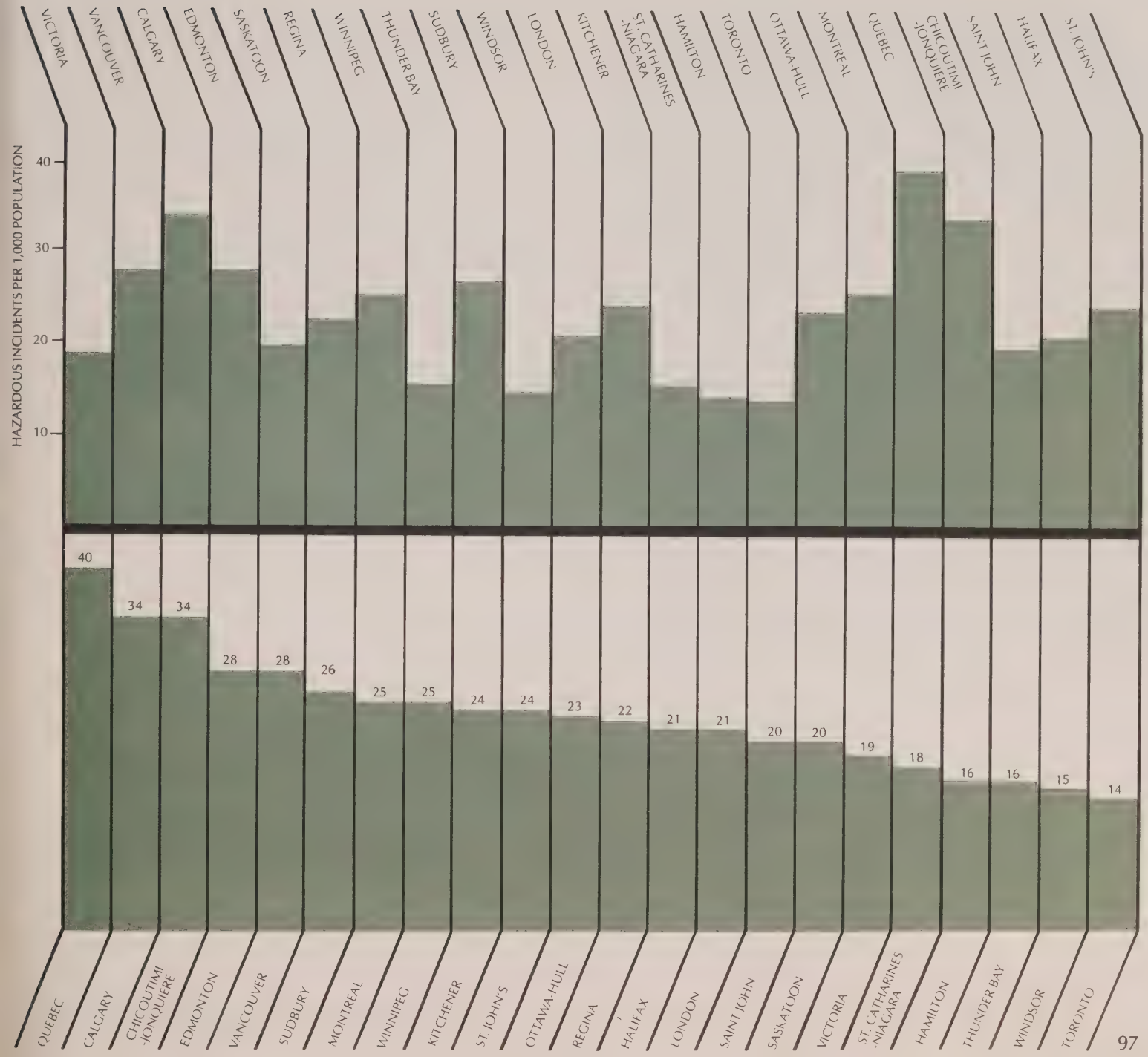
For fire loss, good measures of the nature and scope of the problem would be injuries and fatalities, uninsured losses and unemployment resulting from fires. Better measures for traffic accidents than gross numbers of accidents would be number of fatalities and injuries, and total dollar damage, including cost of personal and family disruptions and medical costs. To some extent surrogates of dollar losses could be had from the comparative rates of insurance. However, these are not readily available.

Other measures would include pedestrians and cyclists injured. Most cities keep counts of these and prepare pin maps of locations. These could be readily collected and comparisons done both between and within metropolitan areas.

[1] The hazard index is the sum of the number of traffic accidents with damage exceeding $100 and of the number of fires, per 1,000 population.

SOURCE:
Statistics Canada, *Traffic Enforcement Statistics 1971*, Catalogue 85-206 (1973) and *Fire Losses in Canada 1971*, Annual Report of the Dominion Fire Commissioner.

FIRE AND AUTOMOBILE HAZARD INDEX, ADJUSTED PER THOUSAND POPULATION (1971)



SOME STATISTICAL ANALYSIS OF THE INDICATORS[1]

A statistical investigation was undertaken for the following purposes:
(a) to determine the extent to which indicators are interrelated, i.e. whether or not there are redundant indicators;
(b) to identify clusters of related indicators; and
(c) to examine the relationship of indicators to the population size and the growth rates of Canada's major urban areas.

Spearman rank correlations were calculated to determine the degree of interrelationship between pairs of indicators. Although interval or ratio level data were generally available for calculating more detailed correlation ratios, rank correlation was used since the statistical reliability of certain indicators was dubious.

A principal components analysis of the array of urban indicators was also done to verify, in a general way, the findings of the rank correlation analysis. Considerable caution is required in interpreting the results from the principal components calculations, since the technique requires an interval or ratio level of measurement for each variable in order to provide an accurate summary of the original data set.[2] The pertinent results accompanied by interpretative commentary now follow.

ARE THERE REDUNDANT INDICATORS?

Table 1 lists statistically significant relationships between indicators. Correlations above 0.8 are relatively few. Only four pairs of variables are sufficiently associated to suggest that they measure essentially the same thing. "Economic well-being of urban residents" and "Type and tenancy of housing" are the two variables with which several of the indicators appear to have 'doubled up,' suggesting that one of these is redundant. Pairs of indicators exhibiting high Spearman rank correlations are:

INDICATORS	R_s
17. Average Income (mean) 18. Average Income (adjusted)	.82
26. Tenure 27. Proportion Apartment Units	− .90
26. Tenure 32. Children in Apartments	− .82
28. Proportion of Apartment Units 32. Children in Apartments	.84

The results of the principal components analysis support the results from the investigation of individual interrelationships between variables. As table 2 illustrates, the patterns of variation within the set of urban indicators are not readily reducible to a few factors. No single factor summarizes a substantial portion of the variance in the data used. The relatively even distribution of the variance across nine factor dimensions suggests that there is only minimal overlap in the urban patterns 'explained' by the indicators.

[1] The statistical analysis does not include the four new indicators (24, 25, 30, 31) added to the revised edition.

[2] For further detail on methods of calculation, see:
(1) SPEARMAN RANK CORRELATION:
Blalock, Hubert M., Jr., *Social Statistics,* second edition. New York: McGraw-Hill, 1972, pp. 415-418.
Nie, N.H. et al., *Statistical Package for the Social Sciences,* second edition. New York: McGraw-Hill, 1975.
(2) PRINCIPAL COMPONENTS ANALYSIS:
Rummel, R.J., *Applied Factor Analysis.* Evanston: Northwestern University Press, 1970, pp. 338-345.
Yeates, Maurice, *An Introduction to Quantitative Analysis in Human Geography.* Toronto: McGraw-Hill, 1974, pp. 209-230.
Nie, N.H., et al., *Statistical Package for the Social Sciences,* second edition. New York: McGraw-Hill, 1975.

TABLE 1

SPEARMAN RANK CORRELATIONS
Listing of statistically significant relationships

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	26	27	28	29	32	33	34	35	36	INDEX OF STATISTICALLY SIGNIFICANT RELATIONSHIPS
JUVENILES CHARGED 1					.62																						-.54						2
CRIMINAL CODE OFFENSES 2						.63				-.51		.50	.46											.56		-.76		-.68			-.69**		7
OFFENSES CLEARED 3													.51																				1
MISSING PERSONS 4				.52	-.55										.52					.57												4
ILLEGITIMACY 5					-.46									.54	.61							-.65								-.60			7
EDUCATIONAL LEVEL 6							-.63		.73					-.63						-.65					.54			.51	-.49*		.68**		11
CULTURAL FACILITIES 7																			.51														1
PUBLIC LIBRARY USAGE 8												.61		.68		-.54				.56								-.52					6
SOCIAL OPPORTUNITIES 9																								.51									1
CULTURAL HOMOGENEITY 10							.77						.61							.56			-.78										6
ETHNIC ORIGIN 11												-.55	-.68			-.50							-.79									.51*	6
ETHNIC PROMINENCE 12													.64			-.56				.66						-.51					-.79**		8
MAJOR ETHNIC GROUPS 13																							.50						.56	.55*			8
POPULATION TURNOVER 14																				.64		-.50			-.49						-.59**		7
HOSPITAL BEDS 15																	-.49					-.55											4
VOTER TURNOUT 16																				-.59													4
AVERAGE INCOME (MEAN) 17																		.82															2
AVERAGE INCOME (ADJUSTED) 18																			.51											.51*			3
OCCUPATIONAL STATUS 19																								-.52					.55**				4
FEMALE LABOUR FORCE 20																															-.67**		8
UNEMPLOYMENT 21																											-.48						1
STRIKE DAYS LOST 22																																	3
HOUSING COSTS 23																																	3
TENURE 26																										-.90		-.82					5
NEW HOUSING PER ADDED HOUSEHOLD 27																																	2
PROPORTION APARTMENT UNITS 28																												.84					4
APARTMENT VACANCY RATES 29																												.49					3
CHILDREN IN APARTMENTS 32																															.62**		7
PUBLIC TRANSIT RIDERSHIP 33																																	3
AIR QUALITY (PARTICULATES) 34																																	3
AIR QUALITY (SO_2) 35																																	6
HAZARD INDEX 36																																	1

NOTES
- The statistical information does not include the four new indicators (24, 25, 30, 31) added to the revised edition.
- Only the upper triangle of the square correlation matrix is displayed, since the lower triangle is the mirror image of the upper triangle.
- Statistical significance was established at the .01 level.
- Number of cases 22, unless otherwise specified.
  *Number of cases 20
  **Number of cases 17
- To assist you in reading the matrix, the number for each indicator has been placed in the appropriate cell along the principal diagonal.

At the same time, the four pairs of indicators identified through rank correlation analysis as highly related also stand out in the principal components analysis.

TABLE 2

PRINCIPAL COMPONENTS ANALYSIS:
Percent total variance explained by each factor within the rotated factor matrix

FACTOR	EIGENVALUE	PERCENT TOTAL VARIANCE
1	4.34	12.74
2	3.84	11.31
3	4.49	13.19
4	3.47	10.21
5	2.28	6.71
6	2.14	6.28
7	2.06	6.05
8	2.27	6.66
9	1.64	4.83

As suggested in Table 3, the three urban indicators which describe attributes of housing type and tenure all feature extremely high factor loadings on the first and largest dimension. Similarly, the two indicators for 'average income' load highly on the fourth factor.

TABLE 3

REDUNDANCY AMONG THE URBAN INDICATORS:
Extracts from the Rotated Factor Matrix

FACTOR ONE: INDICATOR	FACTOR LOADING
28. Proportion Apartment Units	.892
32. Children in Apartments	.845
City Size (as presented in Population Chart.)	.692
33. Public Transit Ridership	.635
2. Criminal Code Offenses	−.564
26. Tenure	−.880
Percent Total Variance	12.73

FACTOR FOUR: INDICATOR	FACTOR LOADING
18. Average Income (adjusted)	.869
17. Average Income (mean)	.807
5. Illegitimacy	−.537
15. Hospital Beds	−.571
4. Missing Persons	−.744
Percent Total Variance	10.21

NOTES:
- The statistical information does not include the four new indicators (24, 25, 30, 31) added to the revised edition.
- Only indicators with Factor Loadings ≤ -0.50 or ≥ 0.50 are listed for each factor.
- Indicators exhibiting the highest degree of interrelationship one with another are underlined.

TABLE 4

STATISTICALLY SIGNIFICANT RELATIONSHIPS

URBAN INDICATOR	NO. SIGNIFICANT RELATIONSHIPS	MODERATE LINKAGE	RELATIVE INDEPENDENCE
1. Juveniles Charged	2		—
2. Criminal Code Offenses	7	*	
3. Offenses Cleared	1		—
4. Missing Persons	4		
5. Illegitimacy	7	*	
6. Educational Level	11	*	
7. Cultural Facilities	1		—
8. Public Library Usage	6	*	
9. Social Opportunities	1		—
10. Cultural Homogeneity	8	*	
11. Ethnic Origin	8	*	
12. Ethnic Prominence	6	*	
13. Major Ethnic Groups	6	*	
14. Population Turnover	7	*	
15. Hospital Beds	4		
16. Voter Turnout	4		
17. Average Income (Mean)	2		—
18. Average Income (Adjusted)	3		
19. Occupational Status	4		
20. Female Labour Force	8	*	
21. Unemployment	1		—
22. Strike Days Lost	3		
23. Housing Costs	3		
26. Tenure	5		
27. New Housing Per Added Household	2		—
28. Proportion Apartment Units	4		
29. Apartment Vacancy Rates	3		
32. Children in Apartments	7	*	
33. Public Transit Ridership	3		
34. Air Quality (Particulates)	3		
35. Air Quality (SO_2)	6	*	
36. Hazard Index	1		—

NOTES: The statistical information does not include the four new indicators (24, 25, 30, 31) added to the revised edition.
Statistically significant relationships were determined at the .01 level using Spearman rank correlations.
* 6 significant relationships or more
– 2 significant relationships or less

The close correspondence in the findings obtained through the use of the two different approaches provides grounds for contending that one of the 'housing type and tenure' as well as one of the 'average income' indicators is redundant and could therefore be eliminated from the data set without undue loss of information.

AN OVERALL SUMMARY VARIABLE?

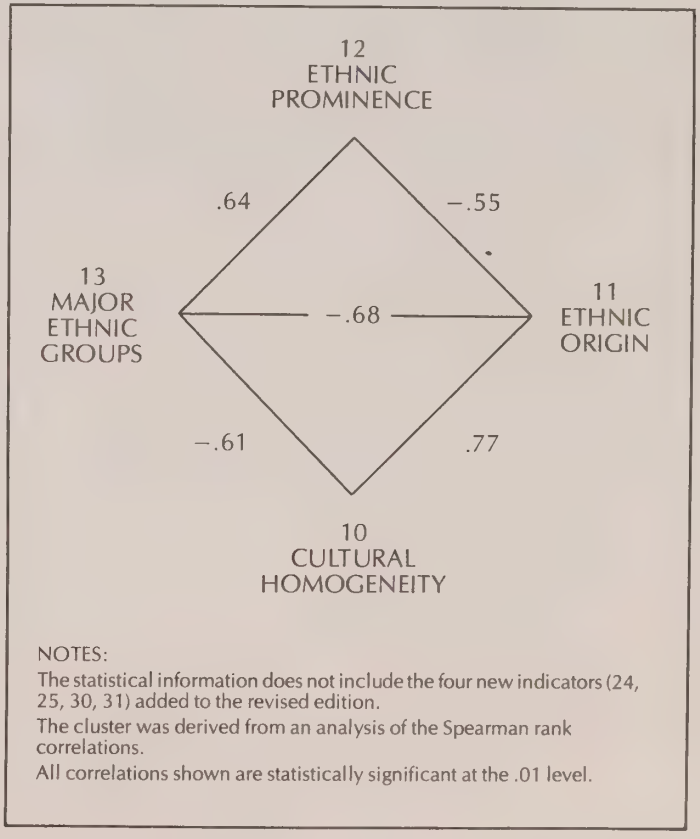
The search for a universal measure that summarizes the quality of life in urban areas is not likely to be successful. The diversity and complexity of urban institutions, practices and lifestyles is such that the derivation of one overall indicator of how one Canadian city is performing vis-à-vis other Canadian urban centres is probably impossible. Nevertheless, we estimated the extent to which each indicator summarized the patterns of variation depicted by all other indicators. A rough measure of the level of summarization achieved by each indicator was obtained by tabulating the number of statistically significant relationships (at the 0.1 level for Spearman rank correlations) that each indicator possessed with others in the data set.

As Table 4 suggests, while a sizeable number of indicators are related to other variables, many others exhibit relative independence. However, none are interrelated with all other indicators to the degree that they might be interpreted as representing an overall summary measure. For example, the 'Educational Level' indicator features the highest number of statistically significant correlations with other indicators (11), but many of the relationships identified are relatively low (approximately 0.5), indirect (occurring through intervening variables), implausible, or uninterpretable.

While no summary indicators were found, we did discover clusters of indicators (see Table 5). The indicators comprising these clusters are not considered redundant since each describes a different feature of ethnic composition and the migration process characteristic of the particular urban area. For example, the indicators

TABLE 5

A CLUSTER OF HIGHLY INTERRELATED INDICATORS MEASURING DIFFERENT ASPECTS OF MIGRATION AND ETHNICITY



NOTES:
The statistical information does not include the four new indicators (24, 25, 30, 31) added to the revised edition.
The cluster was derived from an analysis of the Spearman rank correlations.
All correlations shown are statistically significant at the .01 level.

TABLE 6

THE RELATIONSHIP OF THE URBAN INDICATORS TO THE POPULATION SIZE AND GROWTH RATES OF URBAN AREAS

URBAN INDICATOR	CITY SIZE		GROWTH RATE	
	R_s	SIGNIFICANCE LEVEL		
1. Juveniles Charged	−.14	.274	−.05	.418
2. Criminal Code Offenses	.01	.480	.17	.225
3. Offenses Cleared	.03	.447	.28	.150
4. Missing Persons	−.21	.175	−.13	.285
5. Illegitimacy	−.24	.141	−.16	.242
6. Educational Level	−.19	.196	−.37	.046
7. Cultural Facilities	.26	.123	.05	.411
8. Public Library Usage	.18	.216	.17	.230
9. Social Opportunities	.08	.377	−.16	.259
10. Cultural Homogeneity	−.39	.035	−.48	.012
11. Ethnic Origin	−.42	.025	−.35	.056
12. Ethnic Prominence	−.06	.390	.28	.103
13. Major Ethnic Groups	.61	.001	.35	.058
14. Population Turnover	−.17	.223	.41	.031
15. Hospital Beds	−.48	.013	−.30	.091
16. Voter Turnout	−.23	.148	−.37	.046
17. Average Income (Mean)	.51	.008	.40	.031
18. Average Income (Adjusted)	.49	.010	.27	.112
19. Occupational Status	.43	.022	.38	.042
20. Female Labour Force	.25	.126	.43	.022
21. Unemployment	−.15	.249	−.36	.051
22. Strike Days Lost	.34	.059	.08	.364
23. Housing Costs	.31	.081	.47	.014
26. Tenure	−.32	.072	−.19	.197
27. New Housing Per Added Household	−.01	.482	−.46	.017
28. Proportion Apartment Units	.33	.068	−.04	.422
29. Apartment Vacancy Rates	.21	.178	−.01	.486
32. Children in Apartments	.33	.068	.00	.494
33. Public Transit Ridership	.63	.001	.22	.174
34. Air Quality (Particulates)	.57	.004	.24	.156
35. Air Quality (SO_2)	−.06	.415	−.28	.134
36. Hazard Index	.18	.207	.27	.112

NOTES:
The statistical information does not include the four new indicators (24, 25, 30, 31) added to the revised edition.
Only the indicators underlined have statistically significant relationships with city size or growth rate at the .01 level.

'Ethnic Prominence' and 'Number of Major Ethnic Groups' describe different aspects of a city's ethnic structure, namely the prevalence of a specific 'non-official language' group and cosmopolitanism — the diversity of strong minority cultural groupings in an urban area. Far from being redundant, the cluster of moderately-related indicators provides a greater breadth of information on a specific urban structure and process. A single measure which could adequately describe the process did not emerge.

If our urban indicators are regarded as reasonably adequate measures of the economic, social and environmental aspects of Canada's urban areas, then the association between perceived urban problems (i.e., apartment housing, congestion, crime and pollution) and the population size or the growth rate of Canadian cities is not as high as is commonly believed. Only five of the indicators have a statistically significant association with the measure of city size and only two with growth rates (see Table 6). This evidence might lead us to conclude that social, economic and environmental issues are peculiar to individual cities and are not associated with population size or rates of growth, as has been advanced by some observers of the urban environment.

CONCLUSION

Information has both uses and abuses and, unfortunately, this is not always appreciated. While we must base decisions on the best available information, we must also take into account possible errors in information and interpretation. For instance, the interpretation of a high correlation coefficient for a pair of indicators, as is shown in Table 1, is fraught with difficulties. Cause and effect is not necessarily demonstrated by strong correlations among variables. The presence of intervening variables in the causal linkage and differences in the reliability of the data collected may serve to create a spurious relationship between particular indicators. Those competent in the application of social statistics are probably already aware of these problems. Others unfamiliar with some of the statistical concepts may wish to refer to the references provided below.[1]

We hope that this brief review of the difficulties encountered and the assumptions made will reduce the risk of error and misinterpretation.

[1] Dogan, M., Rokan, S. (eds.), *Quantitative Ecological Analysis in the Social Sciences*. Cambridge, Mass.: M.I.T. Press, 1969.

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